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THE IVORY-BILLED WOODPECKER IN LOUISIANA.

BY GEO. G. BEYER.

ABOUT three years ago I was engaged in Franklin Parish, Louisiana, on certain archæological investigations, but having considerable time to spare, I also took some notice of the bird-fauna of that section of the State, without establishing, however, any special records worthy of notice, with the exception of certain reports of the occurrence of the Ivory-billed Woodpecker (*Campephilus principalis*) in an almost inaccessible swamp, which extends from the most northern portion of Franklin Parish, between the Tensas River and Bayou Maçon, to Black River. All efforts to obtain verification of these reports were unsuccessful at the time, but upon my return to North Louisiana last July, a gentleman handed me the dried head of a female Ivory-bill, informing me at the same time that, owing to the long-continued drouth, he could guide me to the spot where he had shot it and had seen several others.

As the locality was far removed from any human habitation, it became necessary to fit out a regular camping party, and a few days after I started for Big Lake, a large body of water in the midst of a heavy cypress swamp. The borders of the lake as well as the banks of some of the larger cross-bayous are heavily

timbered with ash, oak and elm. In some of such localities are the homes of the Ivory-bills, and from them they do not appear to stray very far, in fact, I was assured that the range of a pair of these birds does not extend more than a mile from their nest.

As soon as we approached the vicinity of Big Lake we could hear quite frequently the rather plaintiff but loud cry of the 'Log-god,' for such the bird is called by those acquainted with it in that section of the State.

The accounts of the habits of this species seem to be considerably at variance. Audubon, for instance, states that the Ivory-bill is never silent, but utters his cry at almost every moment of the day, and then never while on the wing; he furthermore says that it never excavates its nest in a dead tree. On the other hand the late Captain Bendire quotes from one of his informers in his monumental 'Life-histories of North American Birds' exactly the opposite. In the paragraphs referred to, Mr. McIlhenny observes that the Ivory-bills are exceedingly silent, and that he had never heard them excepting when in flight.

From the observations made on our hunt after these birds, I found Audubon's statement correct in so far that, if unmolested and not alarmed, they are certainly noisy, and by their oft-repeated cry we became accustomed to locate them. But when Audubon states that they never build in dead or even dying trees, he certainly was mistaken, for I took one pair with one of their progeny (a young male fairly well feathered) from the nest situated in an old and nearly rotten white elm stump, a little over forty feet from the ground. The entrance to the nests never seems to be as circular as that of other Woodpeckers, but is a little wider than high; moreover, this appearance is greatly augmented by the peculiar and ingenious way of slanting the lower edge of the hole for the purpose of shedding the rain, which otherwise would occasionally beat in. We found and examined several nests, but noticed only one, about twenty-five feet from the ground, in a living over-cup oak. The excavation, however, was rather small, being only a trifle over nine inches deep and eight inches high. We might, in this instance, have doubted the identity of the nest but for the fact of finding two body feathers of an Ivory-bill among the sawdust in the bottom.

Of the breeding habits I could not learn anything at the time, except that I believe only one brood is raised, and that the old birds continue to feed and care for their young long after they are able to take care of themselves. It was then near the middle of July, and old and young birds were still together, and the attention of the old ones was too entirely taken up by the young to have a chance of preparing for a second generation.

The Ivory-billed Woodpecker, in Audubon's time fairly common, is now fast disappearing, and I doubt the existence in our State of another locality where it could be found at the present day, and even in that swamp where I hunted them, they are not uniformly distributed but are confined to two or three localities in the vicinity of Big and Hog Lakes.

Our hunt was quite successful, as I obtained seven specimens in fairly good plumage. The old pair which I found with one of their young in the nest, I mounted with all their belongings. As stated before, this nest was located about forty feet from the ground, and the entrance was nearly hidden by the leaves of the poison ivy (*Rhus radicans*) which had totally covered the lower portions of the old stump. The entrance measures exactly $4\frac{1}{4}$ inches in height and $3\frac{7}{8}$ inches in width. The cavity itself is only nine inches deep and seven and a half inches in height.

The bottom of the nest was covered to the depth of about an inch with fine wood chips and rotten wood dust. The interior was very clean, and every sign of excreta and other household débris had been carefully removed. There was but one young one about, and it remained in close vicinity of the entrance, notwithstanding that it was almost fully feathered and able to fly. Both parents were still feeding it.

CARE OF NEST AND YOUNG.

BY FRANCIS H. HERRICK.

THE sanitary condition of the nest is a matter of great concern to birds, who, as a class, are probably the cleanest of animals. This is especially true of all who breed in holes like Woodpeckers and Chickadees, the young of which are piled up in close quarters and often more than one layer deep. The Woodpecker's hole and the Bluebird's nest are always sweet and clean, and the nestlings immaculate. The parent bird not only ceaselessly carries food to the young, but is often seen hurriedly leaving the nest with a small white package in bill, an action full of significance to every member of the family.

The excrement of the nestlings of Woodpeckers and Passerine birds is surrounded by a transparent sac of mucous, which is probably secreted at the lower end of the alimentary canal, and of such consistency as to allow of its being picked up without soiling bill or fingers, a condition which undoubtedly occurs to some extent in other orders of birds. The Bluebird carries these packages several rods from the nest, and presumably drops them. Many other birds probably dispose of them in this way, but it is not commonly known that others, among which I can now certify the Robin, Cedar Waxwing, and Red-eyed Vireo, devour the whole or a part of the excrement at the nest.

The Robin has undoubtedly been seen by many in the characteristic pose shown in one of the photographs standing on the brim of the nest, and usually with head inclined, as if doting on her young and thinking what fine children they are, when this attitude is really one of sanitary inspection. Shortly after feeding, the nestling becomes very uneasy, raises itself to its full height or tries to do so, and when possible drops the excrement over the edge of the nest. The old bird follows every movement, snaps up the excrement the moment it leaves the body, and either swallows it immediately or carries it away. When seen flying from the nest with head slightly depressed and beak outstretched

the Robin is usually engaged in errands of this kind. In considering such actions I refer particularly to the three species mentioned, which I have watched repeatedly at a distance of two feet or less for hours at a time.

Young Robins are fed and cared for by both parents. I have seen the mother Robin remove the excrement from the nest, devour it, and a moment after take it directly from the young and carry it away. Again, on the following day the same bird, after swallowing all the available excrement, fell to brooding her young and remained in this position full twenty minutes by the watch without showing the least desire to reject anything which had been eaten. I have seen the female Cedarbird come to her nest of five half-fledged young, regurgitate black cherries, and after distributing them, inspect her household with the closest attention, picking up and swallowing every particle of excrement. This mother then spread her wings over her brood, and shielded them from a hot August sun for over an hour. Meantime the male came repeatedly, and passed cherries around. The female who stood erect, straddling the nest, would occasionally inspect her brood and devour the excrement. She would also snap at every passing insect, and I saw her catch a large red ant, which was quickly transferred to the mouth of a young bird. She would erect and lower her crest, stand with mouth agape for long intervals, but there was never a sign of ejecting what had been eaten.

After watching such behavior, which I have seen repeated with slight variations many times, I am convinced that the excrement is actually and definitively swallowed, and not merely taken into the gullet to be regurgitated later. The Cedar Waxwing, however, uses its distensible gullet as a temporary receptacle for food, and it is possible that in this species the excrement goes no farther than the œsophagus, from which it is later ejected. The actions of the bird just described, however, do not favor this idea.

Not only is the nest carefully cleaned, but Robins and Vireos energetically pick their young all over, a very important function, since the minute swarming particles which infest birds' nests, known as bird lice, often cause great discomfort, and especially to the young when weakly.

Cleanliness is an imperative instinct with such birds as the Kingfishers and Bank Swallows, whose nests are placed in the ground, while Barn and Eave Swallows, House Sparrows, and Pigeons represent a considerable number of other species which secure protection by placing their nests in remote, high, or inaccessible places. While their nests may be clean, the ground beneath them usually is not.

It is plainly advantageous for birds which breed on or near the ground to remove every particle of litter which would stain or whiten the leaves and surrounding foliage, and thus advertise the secret of their nest to enemies, even to those who prowl after dusk. When a Red-eyed Vireo, whose behavior I studied at close range, dropped any bit of excrement by accident, she darted after it with such speed that it was snatched up before reaching the ground, or before falling a distance of four feet. Not a trace of defilement is ever seen around the dwellings of any of these birds.

On the other hand, predaceous species like Hawks pay no attention to such matters. The excrement of their young is voided in a semi-fluid state and in a peculiar manner. With tail turned to the edge of the nest the bird shoots it off to a distance of two or three feet, and it may strike the ground six or seven feet from the nesting tree. The only significance which such actions have is that of keeping the nest clean. The advertisement of the nest stains on the leaves below is a matter of indifference to these bold and persistent outlaws, who have little to fear from any enemy save men.

Owls, who breed in holes in trees, are reported to have filthy nests, especially where the cavity has been in use for several successive years, but this seems to be due to the remains of their quarry and to the accumulation of rejected food-pellets rather than to the presence of excrement.

The haunts of certain sea fowl are often reeking with filth during the breeding season, and the guano beds of the South American coast mark the places of assembly and probably of the breeding of myriads of sea fowl for long periods of time. However, the birds themselves and their nests are generally clean, and any other condition in the case of most birds would soon become intolerable.

FIG. 1. ROBIN ABOUT TO CLEAN NEST.

FIG. 2. ROBIN CLEANING NEST.

FIG. 1. BLUEBIRD CLEANING NEST.

FIG. 2. BLUEBIRD CLEANING NEST.

The cleaning of the nest and young is apparently instinctive with the adult bird, and so is also the care with which many avoid soiling the ground and foliage about their nesting sites. They apparently have no choice in these matters, but act because they must. As to eating the excrement, however, it is not so clear. We need many more observations on different individuals before a decision can be reached. If it should be proved that in the Robin, for instance, some individuals never eat the excrement while others do, as we know, we might regard the action as an acquired habit. When the pellicle breaks in the mouth, an accident which I have seen happen in the case of a Robin, the bird must swallow some part in order to get rid of it. Moreover, since digestion in the young is an imperfect process, the substance may serve as a kind of predigested or partially digested food, which might be acceptable to the old birds in times of stress, as in prolonged and heavy storms when food is not easy to procure.

The fact that the Robin removes a part of the excrement from the nest but devours the remainder would seem to imply either that it discriminates what is suited for food, which is improbable, or that this action is a habit not yet fully established, and certainly not ingrained.

DESCRIPTIONS OF PHOTOGRAPHS.

Plate II, Fig. 1. Female Robin inspecting nest. Fig. 2. Male Robin cleaning nest. (In act of swallowing excrement removed from nest; the adherent dead grass is from nest lining.)

Plate III, Fig. 1. Female Bluebird carrying food to young. Fig. 2. Female Bluebird leaving nest hole in act of cleaning nest. (Photographed at a distance of 18 inches.)

NOTES ON SOME OF THE BIRDS OF BRITISH COLUMBIA.

BY ALLAN BROOKS.

1. **Stercorarius longicaudus.** LONG-TAILED JAEGER. — A rare though regular fall migrant to the lower Fraser Valley. I have only observed it during the month of October. One white-breasted adult taken at Sumas Lake.

2. **Gavia alba.** IVORY GULL. — A fine adult was taken at Penticton on the southern extremity of Okanagan Lake during the month of October, 1897, by Mr. J. T. Studley. No cold or stormy weather had occurred to account for the occurrence of this Arctic Gull so far from its habitat.

3. **Xema sabinii.** SABINE'S GULL. — I shot a young specimen on the north end of Okanagan Lake Sept. 9, 1897. I had noticed it for two days, hawking for insects close to the surface of the water in company with large numbers of Night Hawks.

4. **Sterna paradisæa.** ARCTIC TERN.

5. **Hydrochelidon nigra surinamensis.** BLACK TERN. — These are the only species of Tern I have taken in this Province, the former only on Okanagan Lake in October, the latter at several points on both sides of the Cascade Mountains. It breeds in Chilcotin.

6. **Anas discors.** BLUE-WINGED TEAL.

7. **Anas cyanoptera.** CINNAMON TEAL. — Both of these used to breed in numbers in the vicinity of Chilliwack and Sumas, on the lower Fraser, but they are now scarce, owing to the prevalent floods in June which flood out their nests.

8. **Glaucionetta islandica.** BARROWS'S GOLDEN-EYE. — An abundant summer resident in the interior of British Columbia.

9. **Micropalama himantopus.** STILT SANDPIPER.—I shot two Sept. 19 at Sumas Lake, the only ones I have ever seen. They were in the first plumage.

10. **Tringa bairdii.** BAIRD'S SANDPIPER. — Except *T. minutilla*, the most abundant *Tringa* in British Columbia.

11. **Ereunetes pusillus.** SEMIPALMATED SANDPIPER. — Very abundant east of the Cascades and a regular migrant down the lower Fraser and the coast, arriving as a rule about two weeks ahead of *E. occidentalis* in the fall migration.

12. **Accipiter atricapillus.** AMERICAN GOSHAWK.

13. **Accipiter a. striatulus.** WESTERN GOSHAWK. — I have taken both forms both east and west of the Cascades. The latter seems to be the only form that breeds in southern British Columbia where I have noticed

it in summer as far east as Arrow Lake. The two subspecies intergrade perfectly.

14. **Buteo lineatus elegans.** RED-BELLIED BUZZARD. — Only noticed west of Cascades. Rare.

15. **Buteo swainsoni.** SWAINSON'S BUZZARD. — The darkest form of this Buzzard is a common breeder on all the mountains at high elevations, being only found in open or park like country. The only pair of white-breasted birds I ever saw in the Province was breeding on a low mountain near Vernon.

16. **Falco rusticolus.** GYRFALCON. — A regular winter visitant west of the Cascades. Young birds are sometimes almost dark enough for *obscurus*, and adults light enough for the Iceland form. The flight of this Falcon is as a rule rather slow compared with that of other large Falcons, but when in full pursuit of a Duck it gets up a tremendous velocity and can turn and twist almost as quickly as a Goshawk. In ordinary flight the wing stroke is much shorter than a Peregrine's, and the bird when going straight away appears to be hovering like a Kestrel.

17. **Falco mexicanus.** PRAIRIE FALCON. — This species used to be a regular migrant to lower Fraser Valley, but I have not seen or taken one for three years, nor have I ever seen one east of the Cascades.

18. **Falco peregrinus anatum.** PEREGRINE FALCON. — This is the only form I have taken, though *pealei* undoubtedly occurs on the coast. The form breeding on lakes in the interior seems to approach closely the small form that breeds on the Mediterranean (*brookei* Sharp).

19. **Falco columbarius.** PIGEON HAWK.

20. **Falco c. suckleyi.** BLACK MERLIN. — Both of these forms of Merlin occur both east and west of Cascades, but I have never seen a specimen that could not be referred without hesitation to one form or the other.

21. **Falco richardsonii.** RICHARDSON'S MERLIN. — Occurs in migrations only, both east and west of the Cascades.

22. **Falco sparverius.** AMERICAN SPARROW HAWK. — Mr. Brewster identifies specimens from this Province with the form *deserticola* (Mearns). It is a permanent resident throughout the southern portion of the Province.

23. **Syrnium occidentale.** WESTERN BARRED OWL. — Apparently confined to the lower Fraser Valley, where it is a rare and local resident.

24. **Nyctala richardsoni.** RICHARDSON'S OWL. — A considerable irruption of this Owl occurred throughout the southern interior during the winter of 1898–99.

25. **Bubo virginianus.** GREAT HORNED OWL. — The typical form occurs, as well as every possible intergrade between the darkest *saturatus* and *subarcticus*, almost light enough for *arcticus*.

26. **Speotyto cunicularia hypogæa.** BURROWING OWL. — I have three records west of the Cascades. East of them it is a tolerably common breeder in the semi-arid interior.

27. **Glaucidium gnoma californicum.** CALIFORNIA PYGMY OWL. — Mr. Brewster informs me that all the British Columbian specimens which I have sent him are referable to this subspecies.

28. **Coccyzus americanus occidentalis.** CALIFORNIA CUCKOO. — Becoming more abundant in the coast region every year, probably on account of the invasions of the forest tent caterpillar.

29. **Dryobates villosus leucomelas.** NORTHERN HAIRY WOODPECKER. — I have taken the northern form of the Hairy Woodpecker several times in the lower Fraser Valley west of the Cascades.

30. **Picoides americanus alascensis.** ALASKAN THREE-TOED WOODPECKER. — Resident on the Cascades as far south as Mt. Baker.

31. **Picoides arcticus.** BLACK-BACKED THREE-TOED WOODPECKER. — The only form of Three-toed Woodpecker I have observed east of the Cascades.

32. **Chordeiles virginianus.** NIGHTHAWK. — Mr. Ridgway identified specimens I sent him from west of the Cascades as the typical form. I doubt whether *henryi* occurs in British Columbia.

33. **Phalænoptilus nuttalli.** POOR-WILL. — A tolerably common summer resident throughout the southern portions of the semi-arid interior.

34. **Cypseloides niger.** BLACK SWIFT. — Very abundant; breeds at high altitudes.

35. **Otocoris leucolæma.** PALLID HORNED LARK. — A common migrant at Chilliwack (west of Cascades) where I have also taken both the other Horned Larks found in the Province — *merrilli* and *strigata*.

36. **Cyanocitta stelleri annectens.** BLACK-HEADED JAY. — I have a typical example of this form taken within 40 miles of the coast.

37. **Dolichonyx oryzivora albinucha.** WESTERN BOBOLINK. — Occasional both east and west of the Cascades and many breed.

38. **Molothrus ater.** COWBIRD. — Tolerably common east of and a straggler west of the Cascade Mountains.

39. **Xanthocephalus xanthocephalus.** YELLOW-HEADED BLACKBIRD. — I have two records of this species for Chilliwack.

40. **Agelaius phœniceus.** REDWING. — Redwings from southern British Columbia are characterized by very long slender bills, and a very rufous coloration in the female: Mr. Brewster informs me they come closest to *sonoriensis*.

41. **Icterus bullocki.** BULLOCK'S ORIOLE. — Abundant east of the Cascades, and a few pairs breed west of them at Chilliwack.

42. **Loxia leucoptera.** WHITE-WINGED CROSSBILL. — Chilliwack — 3 specimens.

43. **Leucosticte tephrocotis.** GRAY-CROWNED LEUCOSTICTE. — I have taken the typical species as far west as Chilliwack.

44. **Leucosticte tephrocotis littoralis.** HEPBURN'S LEUCOSTICTE. — Breeds above timber line in the Cascades.

45. **Spinus tristis salicamans.** WESTERN GOLDFINCH. — Of irregular occurrence during early winter at Okanagan.

46. **Rhynchophanes mccowni.** McCOWN'S LONGSPUR. — I shot an adult male at Chilliwack on June 1, 1887, and two years later took two females on the same spot.

47. **Ammodramus savannarum perpallidus.** WESTERN GRASSHOPPER SPARROW. — A summer resident near Vernon.

48. **Chondestes grammacus strigatus.** WESTERN LARK SPARROW. — A very scarce summer visitant, both east and west of the Cascades.

49. **Zonotrichia querula.** HARRIS'S SPARROW. — I took two at Sumas (Lower Fraser) 10th January, 1895.

50. **Junco hyemalis.** SLATE-COLORED JUNCO. — I have twice observed and once taken the Eastern Junco at Chilliwack, B. C.

51. **Lanius ludovicianus gambeli.** CALIFORNIA SHRIKE. — My father took one at Chilliwack, April, 1888.

52. **Vireo olivaceus.** RED-EYED VIREO. — The most abundant Vireo both east and west of the Cascades in southern British Columbia.

53. **Helminthophila rubricapilla gutturalis.** CALAVERAS WARBLER. — Common in the Okanagan district.

54. **Icteria virens longicauda.** LONG-TAILED CHAT. — Sumas, 26th May, 1897.

55. **Setophaga ruticilla.** AMERICAN REDSTART. — Regularly east of, and accidentally west of Cascades.

56. **Salpinctes obsoletus.** ROCK WREN. — I have taken only one west of the Cascades (Chilliwack, Nov., 1889). Common in suitable localities in southern interior.

57. **Sitta aculeata.** SLENDER-BILLED NUTHATCH.

58. **Sitta pygmæa.** PYGMY NUTHATCH. — Confined to the region of *Pinus ponderosa*.

59. **Parus hudsonicus columbianus.** COLUMBIAN CHICKADEE. — Common at high elevations in the interior. I have taken it as far west as Nicola. In the mountains west of Arrow Lake I observed all four species of Chickadees associated together — *columbianus*, *rufescens*, *gambeli*, and *septentrionalis*.

60. **Psaltriparus minimus.** LEAST TITMOUSE. — I shot two specimens out of a considerable number on 25th Nov., 1899, but could not find any the next day at same place, nor have I ever seen them before, though I always have looked out for them.

61. **Merula migratoria.** ROBIN. — I have taken the typical form as far west as Chilliwack, although *propinqua* is the resident race.

ARGUMENTS AGAINST THE BANNER MARK THEORY.

BY ABBOTT H. THAYER.

THE following paper is an attempt to show that the Directive Coloration theory is largely a mistake, and that so-called 'banner marks' belong to the greater class of protection patterns and protective colorations. And, secondly, that in many cases they do not serve even in a minor degree as 'banner marks.'

Of course, to any one who feels the inevitability of Natural Selection, it is obvious that each organ or structural detail, and likewise each quality of organic forms, *owes its existence to the sum of all its uses*, so that while it is sustained at a certain stage of development mainly by the value of its principal function, this is only to the degree to which it can perform this without hostility to the other requirements of the organism, each one of the latter modifying it in proportion to its own importance. So that when one says an animal's markings are for this purpose or for that, he speaks inaccurately. Whenever we can know the relative importance of mutual recognition as compared to concealment, and then how much markings help recognition, and how much they help concealment, we shall be in the right track, though still ignoring many factors.

The so-called 'banner marks,' or, as Mr. Thompson has termed them, "*directive coloration marks*" of birds and mammals,[1] have never seemed to me satisfactorily explained by the theory that they exist mainly to aid other animals, both of the same species and of others, both friendly and hostile, to recognize the bearer of the 'banner marks.' Such means seem to me far too crude to play a prominent part in aiding the recognition powers of a class of beings who do so obviously inter-communicate, in many cases by means infinitely more subtile and much more akin to such instinctive methods as guide even the Indian and to some extent the white hunter in the chase. These men could not possibly

[1] Auk, Vol. XIV. pp. 395, 396, pl. iv.

impart or explain the more instinctive half of their wood craft, any more than a man can tell you how he recognizes his wife or child a mile off. It is not necessarily by any detail that he does so, but by the effect of all the combined attributes of the distant figure. It is, as it were, by the chord struck in his brain by the sum of the personal notes revealed in the pose and action of the figure.

When one reflects that even a human being, if he be a student of birds or quadrupeds, can grow to know a great many species so well as to recognize them when they are mere specks in the distance, precisely because each one's every motion in flight or running is such as only that particular species could make, is it not absurd to doubt that creatures infinitely more dependent on such recognition must have developed a corresponding power, and out of all comparison beyond a man's, and consequently have, as to recognition purposes, too little use for the small aid of these markings to keep them in their present high state of development? And while the accepted explanation of these markings seems so feeble, there is another so ample, that, to me at least, it takes possession of the field at a bound. It is Dr. C. Hart Merriam's. His theory is that top and rear markings coöperate with protective gradation in a most striking way for the preservation of the wearer when pursued. Since these bright patterns, such as the white stern and uplifted tail of deer or rabbit, or the white wing-and-tail-bars of many birds, establish, of course, a strong image on the pursuer's retina, so that when, too closely pressed, the quarry, changes tactics, and taking to cover, *closes suddenly his 'banner marks'* (which deer and hares do by dropping their tails and birds by folding wings and tail), he vanishes like magic from his enemy, who is left for just an essential moment staring wildly about to recover the sight of the bright pattern he was chasing, while its possessor is slipping off to still safer cover, enveloped in a cloud of invisibility more than doubled in power by its contrast to the previous conspicuousness. This seems true of deer, hares, and in fact of most creatures that are the *regular prey of others.* Bay-winged Buntings, Robins, Mockingbirds, Rose-breasted Grosbeaks, Towhees, Redstarts, and most War-

blers, Shrikes, Meadowlarks and Nuthatches, are a few American examples of birds which show in flight more or less additional white or bright pattern on their upper sides, which disappears when they close tail and wings. Of course the irregular motion of flight or running brings also into the light the borders of their white underside (which, contrary to Mr. Thompson, is an essential part of their protective coloration when at rest, unless they are squatting), making it aid, for the moment, their conspicuousness.

Now, as to the patterns on the *under* side of wings of soaring birds, and of such species as Plover, which hold their wings stretched upward after alighting; the theory that they are first of all for mutual recognition seems disproved by the foregoing arguments, and we should seek other explanations of their existence in cases where, as I have pointed out, any good observer can recognize the species by its whole 'cut' at a far greater height than one could see the pattern, and if this be true of even human observers, how *can* birds need them for the recognition of each other? Also, as to Plover, it does not seem probable that after being visible and recognizable in flight they should so elaborately raise their wings after alighting for no other reason than the small added recognition-aid they thereby give to their neighbors, especially since their under wing pattern is of course invisible to this neighbor (unless Plovers' eyes be something quite beyond our imagination) until they are so near each other that mutual recognition is inevitable without aid of badges. All these under-wing patterns, without any exception that I can recall, belong to birds that live among backgrounds of similar patterns. They are found on birds that live more or less amidst vegetation, which is the same as saying *where their background abounds in the nearly parallel lines of grass, reed, or tree stems.* They are most lacking on ocean birds which have no such back ground, passing their lives between bare ocean and bare cliffs. These patterns, crossing the main form as they do, belong in appearance to the great class of cross-markings, which in the tiger and many smaller cats, in the zebra, and in many snakes, as well as on many female birds, especially of the Gallinæ, such as the Capercaillie, Blackcock and Prairie-Hen and countless other members of the animal kingdom, unmistakably coöperate

with protective gradation to carry the aspect of the vertical stems, etc., right across the animal, so as to help him disappear.

To sum up: The pattern on the wings of Hawks and Owls, the world over, varies to a surprisingly small degree, which could not be the case if its main object were the distinguishing of the species from each other. Surely no one imagines that it has developed to help show to the rest of the animal kingdom that its wearer is not a Duck, and it shows no propensity to try to distinguish such nearly allied forms as could need it. For instance, even human beings know at a glance the long sharp wing of a Falcon from the broad round one of an Accipiter, long before they are near enough to see the pattern, yet the different species within each of these genera have almost identical under wing patterns. The tail of the American Sparrow Hawk, especially that of the male, is certainly an exception.

Unquestionally Grouse, etc., know an Accipiter from a Buteo without looking for what Mr. Thompson called, by a slip of the mind, the "wrist-mark," and still more obviously must this be the case between the Hawks themselves, for whose benefit alone this pattern could exist, if recognition were its object. In short, if these markings were mainly for identification of one Cooper's Hawk to another, they would avoid the Sharpshin's pattern, while if they were meant to announce the wearer to a Grouse they would hurt his hunting-chances, and we should see, in the Accipiter's wing, signs of imitating the pattern of some harmless Hawk. In other words the advocate of the "banner mark" theory in the case of the under pattern of Hawks' and Owls' wings must face the fact that these birds live mainly in woods or smaller vegetation, and wear, even on the *underside of their wings*, the very patterns nature furnishes to a vast number of vegetation-dwellers, both of birds and mammals; while these patterns are nowhere, or as good as nowhere, found on any species that live wholly away from vegetation. Then, if he still believes that what difference there is, is for recognition, well and good; only, were recognition the *main* use, why do even their under wings retain the twig pattern which tends to *efface* the wing by its resemblance to the twigs and parallel distant tree-trunks, which in the woods form its background, and thus make it harder to distinguish,

while a plain black or white wing, or one with any kind of strong pattern on an empty ground, would serve to distinguish it far better, in the woods? On the other hand, while Gulls have pretty good "banner marks" on their primaries, they miss a great opportunity for immensely greater self-differentiation in powerful under-wing patterns, and if my theory be correct, this they are *prevented from having by the greater importance of coalition in appearance with their blank ocean and cloud back-grounds.*

In short, both the barred wings of wood-dwelling Raptores and the unmarked wings of ocean birds confirm the impression that nature finds it worth while to paint on most animals an imitation of their normal background, even when, as in the case of the under sides of wings, and where such under-sides are habitually exposed to view, there would seem to be small use in it, and her finding this worth while, suggests that we have still much to learn about their home habits.

It is also significant that among our native Raptores, for instance, the three species that wear on their under wings the least amount of cross-barring are those that spend the most of their time *out of the woods* in fields and marshes. They are the Marsh Hawk, Rough-leg and Short-eared Owl.

The deep-wood-dwelling Long-ear has the Short-ear's wing *with some forest pattern added.* Mr. Thompson in his plate of under patterns has wholly omitted the Goshawk's cross-bars, which are like those of the two smaller Accipiters, only fainter. He has also given the Red-shoulder much too strong under-tail bars. Otherwise his diagrams are pretty just, only they give an impression that these patterns are far more visible at a distance than is the case.

I am far from denying that every visible distinction *helps* recognition (though I believe that the uses of the recognition are still very hazily conceived), and have mainly attempted to show what *other* forces are at work upon animals' colors. Unmistakably, nature regards *concealment*, both of the hunter and hunted, as of paramount importance.

One other point: Granting that these under wing barrings make, mainly by their different degrees of local darkness, etc. different patterns, at a distance, at least in different genera,

would it not be still stranger if they did not, or if different, species, with their different habits, were still more alike? Surely this difference of pattern does not clamor for explanation.

Still another argument to show that *protection* is, somehow, the main object of the cross-bars lies in the fact that young birds in many cases are more barred than the adults of the same species just as nature keeps the young of many *ungraded* species graded for protection like their mother.

DESCRIPTIONS OF THREE NEW BIRDS FROM ALASKA.

BY LOUIS B. BISHOP, M.D.

IN STUDYING the collection of birds secured in Alaska during the summer of 1899 by the party from the Biological Survey, of which I was a member, thanks to the kind invitation of Dr. Merriam, Chief of the Survey, I have found that three Alaskan birds differ sufficiently from the same species from other parts of the country to deserve description as subspecies, and that two subspecies already described — *Parus hudsonicus evura* Coues and *Hylocichla ustulata almæ* Oberholser — in the light of more material seem to merit recognition.

Parus hudsonicus from Alaska is certainly subspecifically distinct from *P. hudsonicus* from New Brunswick, and so far as I have been able to study them *hudsonicus* from Ungava, Labrador, and New Brunswick appear the same, but as I have not seen birds from the type locality of *hudsonicus*, or from Ungava in nestling and early fall plumage, I can only hope to throw a little light on the races of this puzzling species.

To the gentlemen in charge of the collections of the Biological Survey, the U. S. National Museum, the American Museum of Natural History, and the private collection of Mr. Brewster, I wish to express my thanks for the privilege of studying large series of these species and for much assistance received, and to Mr. Outram Bangs, Dr. Jonathan Dwight, Jr., and Mr. Homer L. Bigelow for kindly loaning me specimens for comparison.

Canachites canadensis osgoodi, subsp. nov. ALASKA GROUSE.

Type, No. 4310, Coll. of L. B. Bishop, ♀ ad., Lake Marsh, Northwest Territory, July 5, 1899; (W. H. Osgood) L. B. Bishop.

Subspecific characters. — Similar to *Canachites canadensis* but with the ochraceous buff bars replaced everywhere by cream-buff and grayish white. On the upper parts the gray tips are paler, the ochraceous buff replaced by cream-buff and whitish, and the pale bars of the cervix grayish white instead of buff; below the white tips are larger, the pale bars whitish and cream color instead of buff, becoming cream-buff only on the jugulum.

Distribution. — Northwest Territory, Northern British Columbia and Alaska north of the coast mountains.

Measurements of type. — Length, 15.50; extent, 24.25; wing, 7.20; tail, 4.54; tarsus, 1.32 inches. Average length of 4 ♀, 15.38 inches. Average of 6 ♀ and 1 ♂ in wing, 7.62; tail, 4.51; tarsus, 1.34 inches.

Description. — Above irregularly barred with grayish white and black, the pale bars becoming cream-buff on crown and interscapulars and grayish buff on wing-coverts and concealed bars of rump and upper tail-coverts; scapulars and inner tertiaries black, irregularly barred on outer web and tipped with cream-buff and gray with central wedge of white. Quills dusky, mottled on outer web and obscurely tipped with whitish; tail dusky, vermiculated, chiefly on outer web, with grayish buff and tipped with tawny ochraceous. Below barred with grayish white and black, the feathers especially on breast and abdomen broadly tipped with white; the pale bars becoming cream-color on throat and toward base of feathers on sides of breast, and distinctly cream-buff only on jugulum; flanks vermiculated with black, grayish white and pale cream-buff with broad central wedge of white. Tarsal feathering pale mars brown obscurely spotted with darker.

Remarks. — In worn breeding plumage adult females of *osgoodi* differ from *canadensis* from Maine as described above. After completing the summer moult and in early spring females from Alaska differ from females from Ontario and Quebec in the same manner but to a less degree, having the buff everywhere, especially on the cervix and abdomen, paler and the white tips below broader.

A summer male of *osgoodi* from Thirty Mile River differs from summer males of *canadensis* and *labradorius* only in having the tail tipped with paler rufous.

Two adult females of *labradorius*[1] from Mr. Bangs's collection

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[1] Mr. Bangs writes me that these are not the best examples of *labradorius*, but are the most characteristic at present available.

are far closer to *canadensis* than to *osgoodi*. *Osgoodi* in spring has the buff of the entire plumage much paler, and the gray tips of the upper parts, especially the rump and tail-coverts, paler gray, and not the bluish gray of *labradorius*. In worn breeding plumage the difference between the two forms is far more striking, *osgoodi* having the white tips below broader, the buff markings far paler throughout, and replacing the buff bars of the abdomen, cervix and rump with grayish white.

In natal plumage *osgoodi* is paler than *canadensis*, especially on wings, upper wing-coverts, scapulars and crown-patch, and has the tips of the greater coverts and central streak of tertiaries and scapulars white instead of buffy. Maxilla brownish black; mandible and tip of maxilla whitish; soles and tarsi behind maize yellow; scutellæ of tarsi and toes isabella color; nails brown.

In juvenal plumage *osgoodi* is paler throughout than *canadensis*, replacing the rusty everywhere by cream-buff, and the buff throat with whitish.

I have named this form in honor of Mr. W. H. Osgood of the Biological Survey, who secured almost all the specimens of this Grouse taken on our trip.

Sayornis saya yukonensis, subsp. nov. YUKON PHŒBE.

Type, No. 165223, U. S. Nat. Mus., Biol. Survey Coll., ♂ ad., Glacier, White Pass, Alaska, June 8, 1899; W. H. Osgood.

Distribution.— Yukon Valley in summer; Texas in winter.

Subspecific characters.— Similar to *Sayornis saya* but darker, the gray of the upper parts clearer — less scorched, with the pale edgings of the wing-coverts and secondaries narrower; the tail longer; the bill shorter and relatively broader.

Dimensions of type.— Wing, 4.30; tail, 3.58; culmen, .78; bill from nostril, .42; width of bill at base, .33 inches.

Description.— Above dark smoke-gray, darker on head. Lores, orbital ring, ear-coverts, wings and upper tail-coverts dusky, the last darkest. Tail black. Secondaries and tertiaries bordered externally and tipped with whitish; primaries faintly tipped with the same; two whitish bands on coverts across wings. Chest smoke-gray, becoming pale ashy on throat and drab gray on flanks. Abdomen and under tail-coverts pale cinnamon. Under wing-coverts cream-buff, axillars darker buff.

Measurements of fifteen specimens.— Wing, 3.82–4.30 (average 3.99); tail, 3.22–3.58 (average 3.39); culmen, .73–.80 (average .76); bill from

nostril, .38–46 (average .41); width of bill at base, .28–33 (average .31) inches.

Measurements of fifteen specimens of Sayornis saya.— Wing, 3.67–4.27 (average 4.08); tail, 3.03–3.59 (average 3.27); culmen, .75–.83 (average .80); bill from nostril .42–48 (average .45); width of bill at base .27–.34 (average .30) inches.

Remarks.— *Sayornis saya* (Bonap.) is separable into two well-marked races, as described above: *saya*, a paler, rather scorched appearing bird with shorter tail and longer bill, living in California, Lower California, Nevada, Utah, Arizona, Colorado, New Mexico, Mexico and north to Fort Laramie, Wyoming, from all of which localities specimens in the above measured series have been selected; and *yukonensis*, a darker, clearer gray bird, with longer tail and shorter bill, of which besides our Yukon series of eleven specimens, only two of them adults, and winter birds from Texas, I have only seen one typical bird, which was taken at Fort Klamath, Oregon, September 20, 1882, by Captain Bendire. A specimen in Mr. Brewster's collection taken at Haywards, California, February 23, one from Laredo, Texas, January, and a young from Big Bend of the Musselshell River, Montana, August 25, in the U. S. Nat. Mus., are intermediate. Specimen of *saya* from Lower California and Arizona are the palest, those from Colorado — the type locality — the most scorched.

Yukonensis in juvenal plumage differs from *saya* in that plumage even more than do the adults; the rusty suffusion of the upper parts, particularly pronounced on the lower back and rump of the latter, being hardly perceptible in the former, and the throat and chest of *yukonensis* being much darker.

Contopus richardsonii saturatus, subsp. nov. ALASKAN WOOD PEWEE.

Type, No. 4142, Coll. of Louis B. Bishop, ♂ ad., Haines, Alaska, June 2, 1899; L. B. Bishop.

Subspecific characters.— Similar to *Contopus richardsonii* but darker and more olivaceous above, pale margins of secondaries, tertiaries and greater coverts narrower and less white; gray of breast and sides darker and broader; bill shorter and narrower with mandible darker; tarsus longer.

Distribution.— Yukon Valley, southern Alaska and British Columbia near the coast in summer, migrating south through California.

Measurements of type. — Length, 6.69; extent, 11; wing, 3.52; tail, 2.92; exposed culmen, .49; bill from nostril, .38; width of bill at base, .30; tarsus, .62 inches.

Description. — Above clove-brown darker on head; wings and tail brownish black, the secondaries faintly margined externally, the tertiaries more broadly, with whitish; greater and middle wing-coverts tipped with brownish white forming two bars across wings; indistinct orbital ring and loral spot of whitish. Below, including axillars and lower wing-coverts, dull grayish brown becoming darker and more olivaceous on sides of breast and flanks; throat and lower tail-coverts whitish, the feathers becoming grayish-brown centrally; central abdomen yellowish white. Mandible brown, paler toward base.

Measurements of ten specimens. — Wing, 3.19–3.50 (average 3.34); tail, 2.54–2.92 (average 2.66); exposed culmen, .43–.49 (average .46); bill from nostril, .33–.40 (average .37); width of bill at base, .30–.34 (average .32); tarsus, .52–.62 (average .56) inches.

Measurements of twelve specimens of Contopus richardsonii from California, Arizona, Texas and South Dakota. — Wing, 3.14–3.61 (average 3.40); tail, 2.41–2.88 (average 2.66); exposed culmen, .45–.52 (average .49); bill from nostril, 38–43 (average .40); width of bill at base, .33–38 (average .35); tarsus, .48–.55 (average .52) inches.

Remarks. — *Contopus richardsonii* (Swains.), described from a single bird taken at Cumberland House, June 27, is divisible into three well-marked geographical races, — *richardsonii*, inhabiting most of western North America; *peninsulæ*, paler with larger bill, confined to Lower California; and *saturatus*, darker with smaller bill, confined to Alaska and the coast of British Columbia in the summer.

A second specimen of *saturatus* from Haines has the throat as well as the abdomen yellowish. Summer birds from the Yukon Valley and Ducks, Brit. Col. — the latter in the collection of the Am. Mus. Nat. Hist. — are browner, less olivaceous, above than the type, and the Yukon birds have shorter wings and tails, but all are darker than *richardsonii*, and have the small bill, brownish mandible, and longer tarsus of *saturatus*. Males taken at New Westminster, Brit. Col., May 31, and Fort Verde, Arizona, May 10, now in the Am. Mus. Nat. Hist., and another taken at Riverside, Cal., May 11, now in the collection of Mr. William Brewster, closely resemble the type; the latter two are doubtless migrants. Breeding birds in the collection of Mr. Brewster from Chilliwack, B. C., Fort Klamath, Ore., and Nicasio, Cal., are intermediate.

The only specimen of *richardsonii* from anywhere near the type locality that I have seen is a migrating female taken in Towner Co., N. Dak., June 4, 1895, by Mr. Homer L. Bigelow of Boston, and now in his collection. This bird has the mandible yellow, and is fully as pale as *richardsonii* from Arizona, but has a bill as small as the extreme of *saturatus*.

Measurements of this bird are: — Wing, 3.43; tail, 2.73; exposed culmen, .42; bill from nostril, .34; width of bill at base, .30; tarsus, .53 inches.

Parus hudsonicus evura *Coues.* YUKON CHICKADEE.

This subspecies was separated by Dr. Coues in the second edition of his 'Key' on the basis of Alaskan specimens of *hudsonicus* being larger than those from the East. This difference, though existing and most marked in the size of the bill, is very slight. But there are marked differences in the plumage of the young and of adults in late summer that require the recognition of the two forms.

In worn breeding plumage Yukon birds closely resemble those from eastern North America, varying greatly individually in the coloring of the forehead and orbital region, but average slightly deeper black on the throat.

After the summer moult *hudsonicus* from the East goes into a plumage similar to that worn in winter and spring; *evura*, on the contrary, becomes of a color between dark hair-brown and drab on the crown and nape, entirely wanting the rusty of *hudsonicus*, and has less buffy on the back.

Winter birds from the Yukon, also Fort Rae and Fort Simpson, have reached a plumage having the rusty hair-brown head and back of winter *hudsonicus* from Ungava, Labrador, but average slightly *paler* above especially on the head. I fail to see any difference in the shade of the black throat, the chestnut of the sides, gray of side-neck or white of side-head. A single specimen taken at Fort Yukon, September 10, now in the U. S. Nat. Mus. Coll., is indistinguishable from winter birds from the same region, and the type of *P. h. stoneyi* differs only in having paler flanks. A bird taken at Fort Kenai, Alaska, May 10, closely resembles spring *hudsonicus* from the East — Ungava, New Brunswick, etc.

Evura in juvenal plumage differs from *hudsonicus* in the same manner as do fall adults but to a greater degree, having the crown and nape far darker and more drab, the throat much clearer black, far less rusty on the back and breast, and the wings and tail slate-black, with little of the brownish of *hudsonicus* from New York and Quebec. *Evura* in first winter plumage — represented by a specimen taken at St. Michaels September 20, 1899, — has a somewhat paler head than an August adult in fall plumage; but a darker head, blacker throat and less rusty back than young *hudsonicus* — Ungava to New Brunswick — in similar plumage.

Hylocichla ustulatus almæ *Oberholser.* ALMA'S THRUSH.

This subspecies, separated by Mr. Oberholser (Auk, Vol. XV, p. 304), with a type taken in the East Humboldt Mts., Nevada, June 24, proves to be the common Thrush of the Yukon Basin and distinctly separable from *swainsonii.* Yukon birds are grayer above and average paler below and grayer on the sides than the type of *almæ*, and differ greatly in these respects from *swainsonii*, but the type of *almæ* is nearer the Yukon bird than to *swainsonii*, and is grayer than one taken at Lake Marsh, July 5. Our Yukon specimens are more worn than the type of *almæ*, though taken at about the same date.

An adult in winter plumage taken at Circle City, August 20, has the dark markings of throat and breast blacker than in *swainsonii*, the buff of cheeks paler and the upper parts, including wings and tail, darker and more olive.

In juvenal plumage *almæ* differs from *swainsonii* from New Hampshire far more than do the adults. In *almæ* the upper parts, wings and tail are between olive and olive-green — almost the same shade as *aliciæ* in first winter plumage — becoming raw umber on outer edges of quills and wing-coverts, and the central markings of the feathers of crown and scapulars are pale cream-color; far different from the raw umber upper parts with tawny olive edgings of quills and coverts, and bright buff central streaks of feathers on head and back of *swainsonii.* The orbital ring and suffusion of auriculars are cream-color in *almæ*, only the loral stripe approaching the buff of *swainsonii*; the chest and throat are cream-color instead of buff, the dark markings blacker, the

flanks grayer. In fact *almæ* in this plumage differs from *aliciæ* in same plumage taken on the same day only in possessing the loral stripe and orbital ring, having the ground color of the throat, chest and auriculars less white, and the edgings of the quills and wing-coverts slightly paler.

In first winter plumage the same difference obtains, *almæ* being distinguishable from *aliciæ* only by the slightly brighter edgings of the quills and wing-coverts, and the orbital ring, loral stripe, and auricular suffusion of cream-buff; and differs greatly from the raw umber upper parts, wings and tail, and bright buff loral stripe, orbital ring and suffusion of breast, throat and auriculars of *swainsonii*. The dark markings of the breast and the flanks are also darker than in *swainsonii*.

DESCRIPTION OF A NEW SUBSPECIES OF *MELEAGRIS GALLOPAVO* AND PROPOSED CHANGES IN THE NOMENCLATURE OF CERTAIN NORTH AMERICAN BIRDS.

BY E. W. NELSON.

WHILE working on the Mexican birds in the Biological Survey collection, the necessity of certain changes in the nomenclature of several North American species has become evident. These changes refer to *Meleagris gallopavo*, *Colaptes cafer*, *Sayornis nigricans*, *Myiozetetes texensis*, and *Agelaius phœniceus longirostris*. The most interesting development of our recent work is the demonstration of the difference between the Wild Turkeys of Arizona and those of the Sierra Madre of western Mexico as detailed below.

All measurements are given in millimeters.

Meleagris gallopavo merriami, subsp. nov. MERRIAM'S TURKEY.

Type, No. 165898, ♂ ad., U. S. Nat. Mus., Biological Survey Collection. Collected 47 miles southwest of Winslow, Arizona, Jan. 9, 1900, by E. A. Goldman.

Distribution. — Mountains of Arizona, western New Mexico, and south to the Mexican border and north probably into extreme southwestern Colorado.

Subspecific characters. — Distinguished from *M. g. fera* by the whitish tips to feathers of lower rump, tail-coverts and tail; from *M. g. mexicana* by its velvety black rump and the greater amount of rusty rufous succeeding the white tips on tail-coverts and tail, and the distinct black and chestnut barring of middle tail feathers.

Description of adult male in winter. — Neck all around, under side of body to lower abdomen, upper back, scapulars, middle and lesser wing-coverts varying in different lights from rich metallic purplish green to fiery red bronze; feathers of lower back and rump rich velvety black with scarcely any trace of iridescence but tipped with pale rusty white on lower rump; upper tail-coverts broadly tipped with rusty white and with a subterminal band of dark rufous succeeded by a broader band of brilliant iridescent greenish purple, the bases of the feathers narrowly barred black and rufous; the long, outermost upper tail-coverts usually with a broad subterminal rufous band succeeded basally by narrow black and rufous bars; tail including middle feathers tipped with rusty white, with subterminal band of rufous followed by a broad black band and thence to base narrowly barred with black and dark rufous; greater wing-coverts varying from greenish to purplish bronze, with black tips; primaries strongly barred black and white; secondaries similarly marked but white more or less spotted with brown; tertials indistinctly barred and mottled with black, rusty brown and buffy whitish, with purplish and greenish reflections on outer webs; thighs and lower abdomen dull black, feathers narrowly tipped with dull grayish white; feathers of flanks and under tail-coverts tipped with pale rufous (sometimes rusty whitish) with a narrow subterminal band of dark rufous succeeded by a much broader area of iridescent purplish bronze, the base of feathers on flanks dull black, but under tail-coverts barred with black and dark rufous. Spurs short and blunt, sometimes one or both absent. Barb on breast well developed.

Dimensions of type. — Wing, 520; tail, 400; culmen, 41; tarsus, 162.

Adult female in winter. — Head and upper neck usually with a strong growth of black, hair-like feathers; the females differ from males mainly in smaller size and the much duller, less iridescent plumage, less pronounced rufous markings about tail and browner wings; feathers of entire back bordered with gray; borders narrower and darker anteriorly, paler and broader posteriorly and shading into broad whitish tips on rump; the dark gray tips on middle and upper back with a peculiar dark greenish gloss in certain lights; feathers on underparts tipped with paler, more rusty gray than on back, the tips broadening posteriorly; under tail-coverts tipped with rusty white with a narrow subterminal bar of dark rufous.

General Notes. — All recent ornithologists have considered the

Wild Turkeys of Mexico and the southwestern United States (aside from *M. gallopavo intermedia*) as one form which was the ancestor of the domesticated bird. This idea is certainly erroneous as is shown by the series of specimens now in the collection of the Biological Survey. When the Spaniards first entered Mexico, they landed near the present city of Vera Cruz and made their way thence to the City of Mexico. At this time they found domesticated Turkeys among the Indians of that region and within a very few years the birds were introduced in Spain. The only part of the country occupied by the Spanish during the first few years of the Conquest, in which Wild Turkeys occur, is the eastern slope of the Cordillera in Vera Cruz, and there is every reason to suppose that this must have been the original home of the birds domesticated by the natives of that region.

In the 'Proceedings' of the Zoölogical Society for 1856 (page 61), Gould described *Meleagris mexicana* from a specimen obtained by Floresi. Mr. Floresi lived for some time at Bolaños, Jalisco, Mexico, where he had charge of a large mining plant for an English company also operating mines at Real del Monte, Hidalgo. Among the birds sent to England by Floresi, was the type of *Selasphorus floresi*, known to have come from Bolaños, and specimens of *Campephilus imperialis* and *Euptilotis neoxenus*, for which no locality was given, but as both species occur on the mountains within a few miles of Bolaños, it is altogether probable that they came from that place. Gould's description of the type of *Meleagris mexicana* is not sufficiently detailed to determine the exact character of his bird, but fortunately the type was figured in Elliot's 'Birds of North America' (Part X, pl. 1, with text, 1868), and the most distinctive characteristics — the green iridescence on the rump, the maculated and mottled (instead of barred) tail, and the absence of rufous about the tail and tail-coverts — are well shown. In addition Gould's type apparently served for the description of the adult male of *M. gallopavo* in the 'Catalogue of Birds of the British Museum' (XXII, page 387), and an adult female is described in the same volume from Ciudad Ranch, Durango.

These descriptions agree so closely with an adult male and

female obtained by me at El Salto, Durango, that there is little doubt Floresi's specimens came from near Bolaños, which is a little farther south in the same part of the Sierra Madre. Although there are no specimens at hand from the State of Vera Cruz, whence must have come the original *M. gallopavo*, yet the climatic conditions are so different between the cold pine-covered mountain tops on the western side of the tableland frequented by Gould's *M. mexicana*, and the hot, humid tropical and subtropical mountain slopes on the eastern side of the tableland in Vera Cruz, the home of *M. gallopavo*, that there is scarcely a chance of the birds being the same.

Thus it will become necessary to treat *M. gallopavo* and *M. mexicana* as at least subspecifically distinct. Whatever may be the relationship of *M. mexicana* to *M. gallopavo*, the *M. g. merriami* is easily separable from *M. g. mexicana* of the Sierra Madre of western Mexico, from Chihuahua to Colima. Birds from northern Chihuahua are intermediate. In working out these two forms, I have had a fine series of thirteen specimens of *M. g. merriami*, including the type, obtained by Mr. E. A. Goldman near Winslow, Arizona, and nearly as many others representing intermediates from the Mexican border, and typical *M. gallopavo mexicana* from southern Durango.

I take pleasure in naming this handsome bird in honor of Dr. C. Hart Merriam, whose well-known biological survey of San Francisco Mountain was made within sight of the type locality.

Colaptes cafer collaris (*Vig.*).

Colaptes collaris VIGORS, Zool. Journ. IV, p. 354 (1829). Type from near Monterey, California.

General Notes. — The comparison of our large series of Mexican red-shafted Flickers with birds from California and the Rocky Mountain region demonstrates the truth of Mr. Ridgway's idea[1] that they represent two geographic races.

True *C. cafer* is restricted to the tablelands and mountains of Mexico, from near the northern border south to the State of Oaxaca. The birds of California and the Rocky Mountain

[1] Man. N. Am. Birds, 1887, p. 296, footnote.

region of the United States (except range of *C. c. saturatior*) may be distinguished from true *C. cafer* by their larger size, decidedly longer bills, paler upper parts, more sparsely spotted under parts, and broader black tips to tail-feathers. Specimens from northern Mexico are intermediate. *C. cafer saturatior* differs from *C. cafer* mainly in its larger size, less spotted breast, and paler gray on under side of neck.

Myiozetetes similis superciliosus (*Bp.*). TEXAS FLYCATCHER.

Tyrannus superciliosus BONAPARTE, P. Z. S. 1837, 118. Described from specimens taken in Guatemala. Bonaparte credits this name to Swainson but I have been unable to find any justification for this and must, therefore, cite Bonaparte as the authority for the name.

General Notes. — The bird usually recognized by American ornithologists as *Myiozetetes texensis* (Gir.) ranges from Panama north to the valley of the Rio Grande. After examining a large series from numerous localities within this wide range, I have been unable to detect any difference in color between specimens from the extremes of its habitat, but those from Panama are a little smaller than those from Costa Rica and thence northward. Specimens from Guatemala and Mexico are absolutely indistinguishable. This being the case, Bonaparte's name having four years priority over Giraud's *Tyrannula texensis*, and applying strictly to this bird, should replace the latter. From Panama south, there appears to be a direct gradation into the smaller, darker, more olive-backed *Myiozetetes similis* (Spix), Av. Bras., II, p. 18, pl. 25, of Brazil, and as a consequence the form north of Panama must stand as a subspecies under the designation given at the head of these notes.

Sayornis nigricans (*Sw.*) and its subspecies.

Examination of the Black Flycatcher from various parts of its range reveals the existence of three recognizable subspecies. These have each been named, and below are given brief diagnoses of the forms with their ranges.

Sayornis nigricans (Sw.). Under tail-coverts white more or less broadly striped with dusky.

Distribution.—All of Mexico (except Yucatan and the Pacific coast from Colima to the northern border), and north into Texas, New Mexico, and southeastern Arizona.

General Notes.— Swainson described this bird from the "Table-land of Mexico." The type was in the Bullock collection, which was made in the region about the Valley of Mexico, so birds from that district may be considered typical.

Sayornis nigricans semiatra (Vigors). Under tail-coverts pure white.

Distribution.—Pacific coast of Mexico and the United States from Colima to Oregon, including most of Arizona.

General Notes.— Vigors described his bird from a specimen collected during the voyage of the 'Blossom' but gives no locality or habitat. The collection of birds made on the west coast of America during this voyage came mainly from near San Blas, Mexico, and Monterey, California; both within the range of the form having the pure white under tail-coverts. This being the case, we may consider birds from near Monterey, California, as typical.

Sayornis nigricans aquatica (Scl. & Salv.). Under tail-coverts dingy blackish.

Distribution.—Guatemala and south to Costa Rica. The type of this form was described from a specimen taken at Dueñas, Guatemala.

General Notes.—Specimens from Chiapas, Mexico, are midway between true *S. nigricans* and *S. aquatica* and there appears to be a regular gradation from one to the other. The same state of affairs exists to the north where the ranges of *S. nigricans* and *S. semiatra* join. Birds from Texas, New Mexico and Northern Mexico have much less distinctly dusky streaked under tail-coverts than those from Central Mexico, but should be referred to true *S. nigricans*. Both of these forms are thus found within the border of the United States.

Agelaius phœniceus sonoriensis *Ridg.*

In his 'Manual' Mr. Ridgway substituted Salvadori's *longirostris* for his own *sonoriensis* as a name for the Red-winged Blackbirds of Arizona and western Mexico, mainly because the habitat of *A. longirostris* was given as western Mexico. Salvadori described *A. longirostris* from a single adult male, and as the

measurements are about the only means of distinguishing the males of the various forms of *A. phœniceus*, we must rely upon them to determine this bird's relationship. The measurements given for *A. longirostris* — wing, 111; tail, 81; culmen, 27; depth of bill, 10; tarsus, 28 — are sufficient to show that it is decidedly smaller with a longer and slenderer bill than the form described by Mr. Ridgway as *A. p. sonoriensis*. Five males of the latter from Culiacan, Sinaloa, Mexico, average: wing, 127; tail, 91; culmen, 22.5; tarsus, 31; and the smallest of the series measures, wing, 126; tail, 88; culmen, 23; tarsus, 31. South of Culiacan in Mexico the birds are still larger and to the north somewhat smaller, especially in Arizona, whence came the type of *A. p. sonoriensis*, but they never approach the dimensions given by Salvadori. After an examination of the considerable series of birds now available from various points in Arizona and western Mexico, from the Arizona border south to San Blas, Tepic, it is evident that the name *A. longirostris* cannot be properly applied to the bird named *A. p. sonoriensis* by Mr. Ridgway. It is very probable that the type of *A. longirostris* was attributed to western Mexico through some error in labeling.

A REVIEW OF THE THREE-TOED WOODPECKERS OF NORTH AMERICA.

BY OUTRAM BANGS.

IN North America, as is well known, two very different kinds of Three-toed Woodpeckers are found. These are the *Picoides arcticus* series (black-backed Three-toed Woodpeckers), and the *Picoides americanus* series (black-and-white-backed Three-toed Woodpeckers). Both are boreal species and over a very large extent of country a representative of each occur together. Both species may be subdivided into geographical races — *P. arcticus* into two, *P. americanus* into four. Of these six races, one of *P. arcticus*, inhabiting the Cascade Mountains, and one of *P. americanus*, found in Labrador, have not before been recognized. There is furthermore a mistake in the synonymy of *P. americanus* which makes it necessary to give the form of northern New Eng-

land, etc., a new name. In view of these facts, it seems well to publish this short review of the whole group.

Picoides arcticus is a purely American type. *Picoides americanus*, on the other hand, is the American representative of the *P. tridactylus* group.

Hargitt in the 'Catalogue of the Birds in the Collection of the British Museum' (Vol. XVIII, 1890), recognizes, beside the very different *P. funebris* of "Monpin, and the high wooded mountains of Western China," but two Old World forms — *P. tridactylus*, which he accords an immense range, over Europe and Asia, and *P. tridactylus crissoleucus* of central and northern Siberia and Kamtschatka. Other authors have, however, at various times considerably subdivided these two.

Any of the forms of *P. americanus* can always be distinguished from *P. tridactylus* by the pattern of coloration of the 2d and 3d outer rectrices. In *P. t idactylus* these feathers are barred all the way across with black and white, the black bars being usually the wider, and the base of the feathers pure black. In *P. americanus* these feathers are pure white, somewhat marked or barred with black basally. *P. tridactylus crissoleucus* has the outer rectrices much less barred with black than in true *P. tridactylus*, and in this respect approaches *P. americanus*. It differs from *P. americanus* in being much whiter — the crown pure white in the female and the sides, etc., with scarcely any dusky markings.

Both these Old World forms are larger than any of the *P. americanus* series, except *P. americanus dorsalis*, which sometimes nearly equals them in wing measurement.

SYNONYMY.

Picoides arcticus has escaped synonyms. It was described by Swainson, in 1831, as *Picus* (*Apternus*) *arcticus* (F. B. A., II, Birds, pp. xxvi and 313, pl. 57, 1831), from "a male killed near the sources of the Athabasca River, lat. 57°."

There are, however, two races — the typical one, extending from the northern Rocky Mountains to the Atlantic; the other inhabiting the Cascades, and Sierra Nevada of California.

Picoides americanus has a complicated synonymy. In most recent works one finds the name *Picoides americanus* dating from

Brehm, Handb. Vög. Deutschl., p. 195, 1831. Upon looking up this reference I was astonished to find that Brehm's name is a *nomen nudum* and must therefore be dropped. As I believe the work is rare, only two hundred copies having been printed, it may be well to quote Brehm's words. After descriptions of several of his European species, follows in a separate paragraph:

"Ausser den beiden Arten gibt es noch eine Art in Norwegen, welche von diesen verschieden ist und von mir *Picoides septentrionalis* genannt wird und eine grössere ohne zweifel verschiedene in Amerika welche *Picoides americanus* heissen kann." Then in another paragraph he gives the description of *P. septentrionalis*.

As all the forms of *P. americanus*, except *dorsalis* of the southern Rocky Mountains, are much smaller than *P. tridactylus*, the one qualifying word in Brehm ("grössere") is wrong. If *P. americanus* was in reality larger than *P. tridactylus*, Brehm's name even then, in my opinion, should not be considered for an instant.

The first tenable name for an American black-and-white-backed Three-toed Woodpecker appears to be *Picus (Apternus) americanus*, Swainson, Classif. of Birds, II, p. 306, 1837, apparently proposed entirely independently of Brehm, and based upon his own beautiful accurate plate and minute description of *Picus (Apternus) tridactylus* in Swainson and Richardson's F. B. A., II, Birds, pp. 311–312, pl. 56, species 104, 1831, "A male, killed near the sources of the Athabasca River, lat. 57°." This form has since been twice renamed, as follows: *Picoides americanus* var. *fasciatus* Baird, Cooper's Birds of Calif., I, pp. 385–386 (figure of head), 1870, from Fort Simpson, lat. 64°, and *P. tridactylus alascensis* Nelson, Auk, I, p. 165, 1884, from Fort Reliance, lat. (about) 67°.

The two forms of eastern North America — one in Labrador, the other in northern New England, etc. — appear to both need names, those heretofore used for them being untenable.

Tridactylia undulata Cab. & Heine, Mus. Hein., IV, p. 28, 1863, is not admissible, having been, together with several other names (*P. undatus* Temm. and *P. undosus* Cuv.) based on Brisson's *Pic varié de Cayenne*.[1]

[1] Pl. Enl. 553 shows a bird with a red top to its head and four toes, two behind, two in front.

Picus hirsutus Vieill., Ois. de l'Am., II, p. 68, pl. 124, 1807 (*Tridactylia hirsuta* Steph., Shaw's Gen. Zool., IX, p. 219, pl. xxxviii, 1815), in part refers to an American form, though the figures and descriptions were evidently taken from an Old World specimen. This name has been used for an American bird by Wagler, Audubon, De Kay and others.

The form found in the southern Rocky Mountains stands as usually given — *P. americanus dorsalis* — though its northward range, as usually given, should be somewhat curtailed. It was described by Baird as *Picoides dorsalis* (B. N. A., p. 100, 1858), from Laramie Peak, Wyoming.

MATERIAL.

Dr. Robert Ridgway has kindly sent me all the skins of *P. americanus* contained in the National Museum from points in Alaska and the Northwest Territory, including the types of *P. americanus fasciatus* Baird and *P. tridactylus alascensis* Nelson; the series numbering 37 skins and fully proving that true *americanus*, *fasciatus* and *alascensis* are all the same.

I have also examined the large series of *Picoides* in Mr. William Brewster's collection, and a few skins in the collection of the Museum of Comparative Zoölogy at Cambridge. These, with the material in my brother's and my collection, and a series of specimens from northern Labrador lent me by Mr. J. D. Sornborger, makes a fine suite of specimens that leaves little to be desired.

The only region from which I have seen no skins is the central portion of Arctic America, where true *P. americanus* and its eastern races might be expected to intergrade.

I have also seen but two examples of *P. tridactylus*, both females; these two, however, are quite enough to show the differences between the Old World and the American forms.

Picoides arcticus arcticus (*Swainson*).

Picus (*Apternus*) *arcticus* SWAINSON, in Sw. and Rich. F. B. A. II, p. 313, plate, 57, 1831.

Picoides arcticus GRAY, Gen. B. I, p, 434, 1845.

Type Locality. — Sources of the Athabasca River, lat. 57°, N. W. T.

Geographic Distribution. — Boreal America, from Newfoundland and southern Labrador west across the northern Rocky Mts. to Alaska, south to Minnesota and New York and casually to Massachusetts. A common species everywhere in the spruce and fir forest.

Specimens examined. — Total number 58; from the following localities.

Labrador: Bechoine, 1; Makkovik, 1.

Newfoundland: Codroy, 9; Flat Bay, 1.

New Brunswick: Milltown, 2; Restigouche River, 4.

Maine: Bangor, 2; Greenville, 1; Kathardine Iron Works, 2; Upton, 9; Lake Umbagog, 12; Oxford Co., 3.

New York: Lyonsdale, Lewis Co., 1.

Michigan: Cadillac, 3.

Montana: Fort Shaw, 1.

Alberta: Red Deer, 5.

Massachusetts: Wareham, 1.

General Characters. — Size large (wing of adult ♂, 128.5 mm., of adult ♀, 124 mm.); back wholly shining blue-black; a narrow white frontal band; primaries not tipped with white; ♂ with a yellow crown patch; bill large and broad.

Color. — Upper parts shining blue-black, rump feathers with usually a few semi-concealed white spots; a narrow white frontal band; a short, narrow, white postocular stripe; a broad white malar stripe, meeting white frontal band, bordered by a black submalar stripe; nasal plumes mixed black and whitish; wings jet black, with little lustre; primaries spotted and notched with white, but without white tips; secondaries and tertials spotted on inner webs with white; wing-coverts unspotted; when wing is closed no white spots show except those on primaries; below white, heavily marked on sides and flanks with dusky; 2d and 3d rectrices barred and mottled basally with black, clear white (usually stained) for more than half their length; 4th rectrix black basally and at extreme tip, white for a short distance below tip, rest of tail black. Adult ♂ with a bright yellow crown patch, usually cadmium yellow, but in some specimens (young birds in first autumn or winter?) much paler; adult ♀ with whole top of head blue-black, except for white frontal band.

Remarks. — *P. arcticus* can at once be told from any other three-toed Woodpecker by its wholly blue-black back.

It has an enormous range over which it does not vary at all, specimens from the northern Rocky Mountains being indistinguishable from birds taken in New Brunswick and Maine, and even Newfoundland. Some males in autumn or winter have pale yellow crown patches. As it happens, I have seen more of these from Newfoundland than elsewhere, but the adult males in spring from Newfoundland have the crown patch dark yellow, and I

have examined a few skins from other places with light yellow crown patches. It is probably a character of the young male, though I have not seen enough carefully dissected specimens to be sure of this.

The range of seasonal variation in *P. arcticus* is likewise small. Winter specimens are, of course, in a fuller and longer plumage than summer ones, and examples in worn, faded mid-summer plumage are somewhat browner on the back and wings.

In the Cascade Mountains and Sierra Nevada of California true *P. arcticus* is replaced by a form having a peculiarly slender bill.

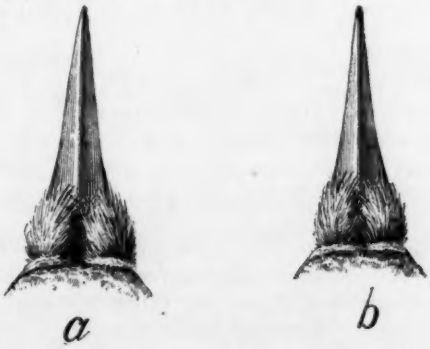
Picoides arcticus tenuirostris, subsp. nov.

Type, from Fort Klamath, Oregon, No. 19576, ♂ adult, Coll. of Wm. Brewster. Collected Dec. 13, 1886, by Dr. J. C. Merrill, U. S. A.

Geographic Distribution. — Cascade Mountains and Sierra Nevada of California, south to Lake Tahoe.

Specimens examined. — Total number, 4; all from the type locality.

Subspecific characters. — Averaging a little larger than true *P. arcticus* (wing of adult ♂, 130.5 mm., of adult ♀, 125 mm.); similar to true *P. arcticus* in color, except that the nasal plumes are blacker — less mixed with white; differing widely from true *P. arcticus* in the shape of the bill, which is long and extremely slender (greatest width of bill in true *P. arcticus*, ♂ ad. being 11.2 mm.; in *P. arcticus tennirostris* ♂ ad. 8.8 mm.). See cut.



A. Bill of *P. arcticus arcticus* (No. 4525, Bangs Coll., from Red Deer Alberta, ♂ ad.).

B. Bill of *P. arcticus tenuirostris*. (Type, ♂ ad.).

Remarks. — That such a stable species as true *P. arcticus*, which does not vary from the Atlantic to the Rocky Mountains,

should suddenly break off into this peculiar slender-billed form in the Cascades is remarkable, and it is possible that *P. arcticus tenuirostris* is in reality an isolated species cut off geographically from the range of true *P. arcticus*.

The four skins I have seen, all from the type locality, are all alike, and in a large series of true *P. arcticus* there is not a single specimen that even approaches them in the shape of the bill.

Picoides americanus americanus (*Swainson*).

Picus (*Apternus*) *americanus* SWAINSON, Classif. of Birds, II, p. 306, 1837. Based upon plate and description of *Picus* (*Apternus*) *tridactylus* in Swains. & Rich. F. B. A. pp. 311–312, pl. 56, 1831. (Sources of the Athabasca River, N. W. T.)

Picoides americanus var. *fasciatus* BAIRD, Cooper's B. of Calif. I, pp. 385–386 (figure of head), 1870. (Fort Simpson, N. W. T.)

Picoides tridactylus alascensis NELSON, Auk, p. 165, 1884. (Fort Reliance, N. W. T.)

Picoides americanus alascensis (NELSON) No. 401*a* of the A. O. U. Check-List.

Type Locality. — Sources of the Athabasca River, N. W. T., lat. 57°.

Geographic Distribution. — Western boreal America and Alaska, south to Montana, Idaho and Assiniboia, in the Cascade Mountains, to the Washington line (49th Paral.), and on the coast at least to Saturna Island.

Specimens examined. — Total number, 45; from the following localities.

Alaska: Nulato, 6; Fort Yukon, 6; Yukon River, mouth of Porcupine River, 1; Fort Kenai, 3; Kodiak, 2; Nushagak River, 1; Unalaklik, 1; Putnam, 1.

Northwest Territory: Fort Reliance, 2 (including the type of *alascensis*); Fort Liard, 4; Fort Simpson, 3 (including the type of *fasciatus*); Fort Anderson, 2; Chiloweynck Lake, 2.

Alberta: Red Deer, 1.

Assiniboia: Near Grenfell, 1.

British Columbia: Cascade Mts., 49th Par., 3; Saturna Island, 2.

Idaho: West slope Bitterroot Mts., 1.

Montana: Columbia Falls, 3. (These three pretty typical *americanus* while two more from the same place approach *dorsalis*, one of them, in fact, being best referred to that race, except that it is smaller.)

General Characters. — Size small (wing of adult ♂, 117 mm., of adult ♀, 114 mm.). Ground color of back and wings brownish black, of head shining blue-black; back black and white — sometimes continuously white along middle line, but more often barred across with black and white, the white predominating; a white postocular stripe meeting white of nape; a white malar stripe; rump and upper tail-coverts usually barred or spotted with white; wings much spotted and notched with white —

the primaries tipped with white, and the wing-coverts frequently irregularly spotted with white; top of head much spotted or freckled with white; crown patch of ♂ bright yellow (lemon yellow to chrome, occasionally cadmium); sides, etc., heavily barred with dusky; 2d and 3d rectrices white, irregularly barred toward base of feathers with black.

Winter specimens, usually with more white above than summer specimens.

Color. — Ground color of back and wings brownish black, of head shining blue-black; nape white; back, from nape to rump, mixed black and white — the white usually predominating, but the pattern very variable — in some specimens the back is continuously white along middle line, in others the whole region is barred across with black and white; upper tail-coverts usually, but not always, irregularly spotted or barred with white; a white postocular stripe meeting white of nape; a white malar stripe, bordered by a black sub-malar stripe; auriculars and cervix shining blue-black; top of head (more noticeable in the ♀) heavily freckled with white — in many examples the white in excess of the black; nasal plumes mostly whitish, a few only being dusky; wings brownish black, primaries, secondaries and tertials conspicuously tipped, spotted and notched with white; wing-coverts often (but by no means always) irregularly spotted with white — the pattern often different on the opposite feathers; when closed, the wing shows much white; below white heavily barred on sides and flanks with dusky; under tail-coverts, white at ends, dusky at base, and sometimes barred; three outer rectrices white (usually stained, yellowish-brown) at ends, barred very irregularly, lower down the feathers with half bars and spots of black; 4th rectrix black with white end and one or two white spots lower down the feather; four middle rectrices black with a few white notches on both webs. Adult ♂ with a bright yellow crown patch, usually about chrome, though sometimes lemon yellow and sometimes cadmium; adult ♀ with whole top of head blue-black heavily freckled with white.

Remarks. — True *Picoides americanus* has a wide range through the western Fur Countries and Alaska and is a very variable bird. The variations, though partly seasonal, are to a great extent individual and consist in the greater or less amount of white in the back, head and wings.

The species has a curious history. It was at first confused with the Old World *P. tridactylus*, but in recent works has appeared as *P. americanus* Brehm. Brehm's name proves to be a *nomen nudum* and the species dates from Swainson, who figured and described the same form, afterwards named *fasciatus* by Baird, and still later *alascensis* by Nelson. The fine series before me proves conclusively that these three names apply strictly to one geographical form.

A fairly large series of skins from any one place within the range of the form will be sure to cover the whole range of variation. Thus the type of *alascensis*, from Fort Reliance, N. W. T., an adult ♂, killed in November, is one of the whitest examples before me — the whole back and rump are continuously white, the wings are very heavily marked with white and the wing-coverts thickly spotted, the upper tail-coverts are barred with white and the top of the head is more white than black, the crown patch is pale lemon yellow; on the other hand, No. 78614 from the same place, an adult ♂, also taken in November, stands at the opposite end of the range of variation; — the back is barred across with black and white in about equal amounts, the wing spots are all small and inconspicuous, the wing-coverts are unspotted, the upper tail-coverts with only one or two small white spots, and the head with but few white freckles; the crown patch is deep chrome. This specimen is a pretty good match for Swainson's plate of his type, except that it has the white bars on the back narrower than those of Swainson's figure. A series of six skins from Fort Yukon, and another of four skins from Fort Liard, each include examples of the whitest and of the darkest style. The two blackest specimens in the large series from the Northwest, are an adult ♀ taken Dec. 12 at Fort Simpson (No. 19426), and an adult ♀ taken Sept. 18 at Fort Yukon (No. 73378). These two are very similar; both have the minimum amount of white on the back and wings, unspotted wing-coverts, no white markings on upper tail-coverts, and the head in both is clear blue-black without white freckles. No. 19426 has the white postocular stripe, but even this is wanting in No. 73378, which might well pass for an eastern bird, having much the general appearance of specimens from Labrador.[1]

As a rule summer specimens are blacker than winter ones, but individual variation is so great that this does not always hold true.

In the southern Rocky Mountains true *P. americanus* is replaced by a much larger form, *P. americanus dorsalis*, having the

[1] This skin was collected by Turner, and may be wrongly labeled, through some accident, as Turner collected both in Labrador and Alaska.

back always continuously white along the middle line. The two apparently intergrade in Montana.

In eastern North America true *P. americanus* is replaced by two races, one in Labrador the other in northern New England, etc. From either of these true *americanus* differs in the much greater amount of white in the upper parts, and in having a white postocular stripe. In the eastern forms this stripe is either wholly absent or indicated by an occasional isolated white feather or two. I do not know exactly where the eastern races meet true *P. americanus*, there being a dearth of specimens from the central portion of Arctic America.

In the Bangs Collection there are two examples of *P. americanus* from Saturna Island, B. C., that in every way are referable to the typical subspecies, except that the under parts are not pure white, but are pinkish smoke-gray — one skin showing this more strongly than the other. This coloring of the under parts is occasionally shown by eastern birds and may be due to staining.

Picoides americanus dorsalis *Baird.*

Picoides dorsalis BAIRD, B. N. A., p. 100, 1858.

Picoides americanus var. *dorsalis* BAIRD, Cooper's B. Calif., p. 386, 1870.

Type Locality. — Laramie Peak, Wyoming.

Geographic Distribution. — Southern Rocky Mountains, from New Mexico north to Montana, where intergradation takes place with true *americanus*.

Specimens examined. — Total number, 12; from the following localities.

New Mexico: Santa Fé Mountains, 1.

Colorado: Platte Cañon, 3; Jefferson Co., 2; Silverton, 1; Stony Gulch, 2; Beulah, 1.

Montana: Columbia Falls, 2 (intergrades; except in size, nearer *dorsalis* than true *americanus*).

Subspecific characters. — Size largest of the *americanus* series (wing of adult ♂, 126 mm., of adult ♀, 121 mm.); ground color of back and wings brownish black, of head shining blue-black; back from nape to rump continuously white along middle line, *not* barred across with black; white postocular and malar stripes broad and conspicuous; white markings and spots on primaries, secondaries and especially on inner webs of tertials, large; no white spots on wing-coverts; upper tail-coverts usually unspotted; top of head but little freckled with white; sides and flanks with fewer dusky markings, which are more like spots, less like

bars, than in true *americanus;* pattern of 2d and 3d rectrices usually, but not always, different from that of the other forms of the *americanus* series, the 2d rectrix being black basally, then white, and the 3d rectrix black for its basal half, then white, both feathers otherwise unbarred, though occasionally there is a white spot or two in the black basal portion, in both feathers the white extends down beyond the black on both outer and inner edges. In true *americanus* the 2d and 3d rectrices are usually spotted and half barred with black basally. Adult ♂ with a yellow crown patch, about chrome, smaller in extent and more mixed with black than is the crown patch in the other forms; adult ♀ with the whole top of the head shining blue-black, but little freckled with white. Bill usually longer and stouter than in any other forms of *americanus*.

Remarks. — *P. americanus dorsalis* is a large, alpine form of *americanus* inhabiting the southern Rocky Mountains. Montana appears to be the dividing line between it and true *americanus* and here at one place — Columbia Falls — one may get examples that approach true *americanus*, and others that are hardly distinguishable from *dorsalis*, except that all the Montana specimens are rather smaller than birds from farther south.

P. americanus dorsalis can always be told from true *americanus* by its larger size, stouter, longer bill, whiter — less marked with dusky — sides and the longitudinal white striping of the back. The smaller crown patch of the ♂ and the different pattern of the outer tail-feathers are additional characters that usually but not always distinguish this race from true *americanus*.

In any large series of true *americanus*, there will be sure to be some skins with the back continuously white and not barred with black; these have a look of *P. americanus dorsalis*, but their smaller size and shorter, lighter bills show they are not that form; the white portion of the back is also wider than in *P. americanus dorsalis*.

Picoides americanus bacatus,[1] subsp. nov.

Picoides americanus BREHM, No. 401, A. O. U. Check-List.

Type. — From Bangor, Maine, No. 802, ♂ adult, Coll. of E. A. and O. Bangs. Taken by E. S. Bowler, March 25, 1884; skinned and sexed by E. A. Bangs.

Geographic Distribution. — Eastern boreal America south of the St. Lawrence — south to the mountains of New York and rarely or casually

[1] *Bacatus*, set with pearls. On account of the white of the back being reduced, in this form, to a series of spots.

to Massachusetts. Of rather local distribution throughout the spruce and fir forest, but commoner in the mountains than in the lowland forest.

Specimens examined. — Total number 21; from the following localities.

Maine: Bangor, 6; Mt. Katahdin, 1; Lake Umbagog, 5; Attian Pond, Moose River, 1; Upton, 1; Oxford Co., 1.

New Hampshire: Connecticut Lake, 1; Mt. Washington, 1; White Mountains, 1; Megalloway R., 2; Gorham, 1.

Subspecific characters. — Smallest of the *americanus* series (wing of adult ♂, 113.5 mm.; of adult ♀, 110 mm.); ground color of back and wings brownish black, of head shining blue-black; all the white markings on back much reduced, being usually a series of white spots confined to center of back from nape to rump; upper tail-coverts and wing-coverts usually unspotted (occasionally a few small, white spots on upper tail or wing-coverts or both); postocular stripe (so conspicuous in true *americanus*) wholly absent or indicated by only a few scattering white feathers; white malar stripe narrower than in true *americanus;* white markings on primaries, secondaries and tertials fewer and smaller; top of head in both sexes much less heavily freckled with white; adult ♂ with a bright yellow crown patch, about gamboge yellow;[1] otherwise similar to true *P. americanus.*

Remarks. — *P. americanus bacatus* is not a common bird in collections and much is still to be learned concerning its exact distribution. Most of the recorded specimens come from Maine, New Hampshire, and the Adirondack region of New York.

P. americanus bacatus is subject to much less variation, both individual and seasonal, than true *americanus.* There is, however, a slight amount of individual variation in the white markings above, some specimens showing a few white spots on the upper tail-coverts and wing-coverts, though these parts are usually black. The postocular stripe is more strongly indicated in some examples than in others, and the amount of white on the nape varies a little. This form can always be told from true *americanus* by the less amount of white everywhere above. It also averages smaller.

North of the St. Lawrence, becoming more and more strongly characterized as it extends up the Labrador coast, is a larger and much blacker form. This form and *P. americanus bacatus* appear to intergrade in Quebec. Where either of these eastern forms

[1] Young females, in nestling plumage, have a yellow crown patch, smaller than that of the adult male. I have seen nestlings of this form only, but probably the young female in other forms also has the yellow crown patch.

intergrade with true *americanus* is not known to me, but it is probably somewhere in northwestern Ontario.

Picoides americanus labradorius, subsp. nov.

Type, from Okak, Labrador, No. 1365, ♂ adult, Coll. of J. D. Sornborger. Collected, June, 1895, by C. Schmitt.

Geographic Distribution. — Whole Labrador peninsula, north to tree limit, south into Quebec. Exact western limit of range unknown.

Specimens examined. — Total number 33; from the following localities.

Labrador: Okak, 8; Nain, 4; Hopedale, 3; Makkovik, 4; (northern Labrador), 1; Black Bay, 2; Lance au Loup, 2.

Quebec: Chaunay, 8 (not typical).

Anticosti Island: 1, (♀ juv., nestling plumage, probably this form).

Subspecific characters. — Larger than *P. americanus bacatus*, nearly equaling in size *P. americanus americanus* (wing of adult ♂, 116 mm.; of adult ♀, 113 mm.); ground color of back and wings jet black (brownish black in *P. americanus bacatus*), of head dark shining purplish blue-black, the shining blue-black of head reaching farther backward, covering sides of neck, nape and shoulders, and in fresh plumage often the whole back; all the white markings on back and wings even more reduced than in *P. americanus bacatus*; primaries sometimes not tipped with white, and the white spots on back, wings and head smaller and fewer; sides and flanks much more heavily marked with black — the markings themselves blacker and the pattern coarser; tail usually more barred with black, the second and third rectrices sometimes being barred nearly to the ends of the feathers; crown patch of ♂ darker yellow, about ochre yellow (that of *P. americanus bacatus* being about gamboge yellow).

Remarks. — *Picoides americanus labradorius* is the blackest of the American black-and-white-backed three-toed Woodpeckers, the ground color of the back being often as black and as shining as in *P. arcticus*. It differs noticeably from *P. americanus bacatus*, the only form with which it needs comparison, in its deep black wings and back, the heavy markings on the sides, and the darker yellow crown patch of the males, besides being a good deal larger.

P. americanus labradorius is generally distributed over eastern Labrador north to tree limit, and extends south into Quebec, becoming less well marked southward. A series in Mr. Brewster's Collection from Chaunay, Quebec, I refer to this form. They average smaller, however, than birds from northeastern Labrador, but their backs are much blacker and the crown patch of the males darker yellow than in *P. americanus bacatus*. Taken all together they are evidently intergrades, though nearer the northern than the southern form.

MEASUREMENTS OF *Picoides arcticus arcticus* (SWAINSON).

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
4648[1]	♂	Mont., Fort Shaw.	129	80	23	36
47529	♂	Alberta, Red Deer.	130	75	24	34
4525[2]	♂	" " "	129	77	23.2	36
4526	♂	" " "	129.5	82	23.2	34.5
18635[1]	♂	Mich., Cadillac.	128	81	23	33
18636	♂	" "	127	80	23	35
9845	♂	Lab., Bechoine.	131	79.5	24	34
46283	♂	Nf'l'd, Codroy.	129	80	23	34
46284	♂	" "	128	79	23.2	34
46287	♂	" "	130	77.5	23.8	35
46288	♂	" "	130	75	23.4	36
46402	♂	N. B., Milltown.	131	82	24	36
4520[2]	♂	N. B., Restigouche R.	127	81	24	35
4521	♂	" " "	126.5	77	23.2	33
4522	♂	" " "	129	82	23.2	33
800	♂	Me., Bangor.	128.5	82	24	36
30207[1]	♂	Me., Lake Umbagog.	129	78	24	34.5
4510	♂	" " "	128.5	78	24	34.5
30350	♂	" " "	129.5	79.5	23.4	36
4524[2]	♀	Alberta, Red Deer.	127	79	22	33
4527	♀	" " "	124	80	22	33
——[3]	♀	Lab., Makkovik.	125	82	22	32.5
46289[1]	♀	Nf'l'd, Codroy.	124.5	77	21.6	32
46290	♀	" "	123	78	21.4	30
46403	♀	N. B., Milltown.	123.5	78	23	31.5
801[2]	♀	Me., Bangor.	126	80	21.8	32
11970[1]	♀	Me., Lake Umbagog.	124	80	21	31.5
8109	♀	" " "	123	78	22	31
30208	♀	" " "	123	77	22	32
10949	♀	" " "	124.5	76.5	23	32

MEASUREMENTS OF *Picoides arcticus tenuirostris* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
19576[4]	♂ (Type)	Oregon, Ft. Klamath.	132	83.5	22.6	36
19577	♂	" " "	129	80	22.2	35
19578	♀	" " "	125	81	22.2	33
26263	♀	" " "	125.5	84	21.8	33

[1] Coll. of Wm. Brewster.
[2] Coll. of E. A. & O. Bangs.
[3] Coll. of J. D. Sornborger.
[4] Coll. of Wm. Brewster.

MEASUREMENTS OF *Picoides americanus americanus* (SWAINSON).

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
49905[3]	♂	Alaska, Nulato.	116	77	20.2	29
70809	♂	" "	117.5	74	20.4	30.5
49896	♂	" "	116	73	19.6	28
73376	♂	Alaska, Ft. Yukon.	118	79	20.6	30
76059	♂	" " "	117	73	20.2	29.5
124583	♂	" " "	117	76	20	29.5
58717	♂	Alaska, Ft. Kenai.	116.5	72	20.4	30
95273	♂	Alaska, Kadiak.	116	72	20.6	29
78614	♂	N. W. T., Ft. Reliance.	119	79	20	30
78615[4]	♂	" " "	117	75	20	—
19481	♂	N. W. T., Ft. Liard.	115	73	19	31
19414	♂	" " "	121	77	20	30.5
19423	♂	" " "	116	73.5	20	29.5
27126[5]	♂	N. W. T., Ft. Simpson.	118	75.5	20	30
43175	♂	N. W. T., Ft. Anderson.	118	77	19	31
1511[2]	♂	Assiniboia, Grenfell.	116.5	72.5	20	30
4509	♂	B. C., Saturna Island.	117	75	20.2	29
4510	♂	" " "	117.5	73	20.2	30.5
131496[3]	♂	Mont., Columbia Falls.	118	78	20.4	30
47299[1]	♂	" " "	115	73.5	21.6	30
47300	♂	" " "	116	76	20.4	30
1510[2]	♂	" " "	117	70	20.8	31
70808[3]	♀	Alaska, Nulato.	112	74	19.6	27.5
78618	♀	" "	115	74	19.2	26.5
49894	♀	" "	113	75	19.4	28
73378	♀	Alaska, Ft. Yukon.	112.5	74.5	19.8	27.5
70812	♀	" " "	112	72	19.8	27.5
124584	♀	" " "	112	75.5	19.8	27.5
58719	♀	Alaska, Ft. Kenai.	114	73.5	19.4	29
54241	♀	Alaska, Kadiak.	112.5	77	20	26.5
19413	♀	N. W. T., Ft. Liard.	112	74	18.6	26
19426	♀	N. W. T., Ft. Simpson.	115.5	76	19.6	26
22599	♀	" " "	116.5	73	19	26.5
43176	♀	N. W. T., Ft. Anderson.	113.5	76.5	20	27
47358[1]	♀	B. C., Cascade Mts., 49th Par.	113	71	19.6	27.5
45600	♀	" " " " "	110.5	69	19.2	27
131497[3]	♀	Mont., Columbia Falls.	117	73	20	26.5

[1] Coll. of Wm. Brewster.
[2] Coll. of E. A. & O. Bangs.
[3] Coll. of U. S. National Museum.
[4] Type of *alascensis*.
[5] Type of *fasciatus*.

(NOTE: The specimens from Columbia Falls, Montana, are all referable by measurements to *P. americanus americanus*; two out of the five, however, in all other respects are nearer to *P. americanus dorsalis*.

MEASUREMENTS OF *Picoides americanus dorsalis* BAIRD.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
9818[1]	♂	N. M., Santa Fé Mts.	127	76	21.6	32
46400	♂	Col., Stony Gulch.	126	78	21.2	30
805[2]	♂	Col., Platte Cañon.	127	76	21.8	32
1512	♂	Col., Jefferson Co.	124	—	20.4	32
1513	♂	Col., Beulah.	125	76	20.4	31.5
46401[1]	♀	Col., Stony Gulch.	124	79	20.6	29
9913	♀	Col., Platte Cañon.	119	76	20.2	29.5
804[2]	♀	" " "	123.5	76.5	21	31
26036[1]	♀	Col., Jefferson Co.	118	73.5	20.8	29
9904	♀	Col., Silverton.	121	81	21	30

MEASUREMENTS OF *Picoides americanus bacatus* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
802[4]	♂ (Type)	Me., Bangor.	113	75	20.2	28.5
4531	♂	" "	111	72	20	29.5
4532	♂	" "	112	73.5	20.4	29
30209[3]	♂	Me., Lake Umbagog.	113	72	20	29
26281	♂	" " "	115	73	21	29.5
10975	♂	" " "	112	72	20.8	28.5
1293	♂	Me., Upton.	114.5	72	21	28.5
3414	♂	Me., Attian Pond, Moose R.	114.5	72	19.6	29
46399	♂	Me., Mt. Katahdin.	115	73	20.2	29
42611	♂	N. H., White Mts.	115	72.5	20	28
1292	♂	N. H., Gorham.	114	74	21	30
30767	♂	N. H., Megalloway R.	113.5	73.5	20.2	28
803[4]	♀	Me., Bangor.	110	72	19.8	26
4530	♀	" "	111	74	20	26
4529	♀	" "	110.5	74	19.8	27
26282[3]	♀	Me., Lake Umbagog.	110	75	19.8	—
9585	♀	" " "	110	74.5	19.6	26
25647	♀	Me., Upton.	110	70	19.2	26.5
30768	♀	N. H., Megalloway R.	110	70	19.2	26

[1] Coll. of Wm. Brewster.
[2] Coll. of E. A. & O. Bangs.
[3] Coll. of Wm. Brewster.
[4] Coll. of E. A. & O. Bangs.

MEASUREMENTS OF *Picoides americanus bacatus* + *labradorius*.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
7382[1]	♂	Queb., Chaunay.	113	75	20.6	30
7378	♂	" "	115	73	20.2	30
7380	♂	" "	114	73.5	20.2	29
7381	♂	" "	113	75	20	29
7383	♀	" "	113	72.5	19.8	26
7386	♀	" "	112.5	73	19.2	25.5
7379	♀	" "	111.5	75.5	20	26
7384	♀	" "	111	71	19.2	26

MEASUREMENTS OF *Picoides americanus labradorius* BANGS.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
1365[2]	♂ (Type)	Lab., Okak.	119	81	20.4	29
1366	♂	" "	116	73	21	29
1360	♂	" "	118	73.5	20.2	28
1370	♂	Lab., Nain.	115	65	20	28.5
1367	♂	" "	115.5	61	21	29
1354	♂	Lab., Hopedale.	116	77.5	21	28.5
1356	♂	" "	115.5	72	20.2	28
——	♂	Lab., Makkovik.	117	75	21	30
4497[3]	♂	Lab., Lance au Loup.	115	73.5	20.2	30
4500	♂	Lab., Black Bay.	116	74	21	28.5
4499	♂	" " "	115	74	21	28
1363[2]	♀	Lab., Okak.	114	78	20.2	27
1358	♀	" "	112	75	19.6	26
1359	♀	" "	112.5	76.5	20	26
1361	♀	" "	111.5	72.5	20	27
1362	♀	" "	114	77.5	19.4	25.5
1369	♀	Lab., Nain.	110	72.5	19.2	28
1368	♀	" "	116	80	21	27.5
1355	♀	Lab., Hopedale.	112	76	20	28
——	♀	Lab., Makkovik.	115	74	19.2	26.5
——	♀	" "	112.5	75.5	20	27
4498[3]	♀	Lab., Lance au Loup.	114.5	75.5	20	27

[1] Coll. of Wm. Brewster.
[2] Coll. of J. D. Sornborger.
[3] Coll. of E. A. & O. Bangs.

THE MOULT OF THE NORTH AMERICAN *TETRAONIDÆ* (QUAILS, PARTRIDGES AND GROUSE).

BY JONATHAN DWIGHT, JR., M.D.

Plates IV and V.

(*Concluded from page 51.*)

Dendragapus obscurus (*Say*). DUSKY GROUSE.
" " **fuliginosus** *Ridgw.* SOOTY GROUSE.
" " **richardsonii** (*Dougl.*). RICHARDSON'S GROUSE.

The material examined, although not very extensive, shows the same sequence of plumages and moults as among the Quails.

Natal Down. — Above rich buff mottled with black and spotted with black on the forehead and sides of the head. Below dull buffy white. Two specimens of *obscurus* (Amer. Mus. Nos. 63989 and 63990, Utah, June 15) are mere chicks; but much of the juvenal plumage has grown on the upper surface and the first and second primaries are just in sight, the others being far more advanced, while the tail is also visible.

Juvenal Plumage, acquired by a complete postnatal moult. Above grayish brown with buff or whitish shaft-streaks and irregular barring or mottling of black, buff and gray; the crown reddish tinged. Below chiefly white with a thick sprinkling of black spots except on the chin. Two specimens of *fuliginosus*, about half grown (Amer. Mus. Nos. 45275 and 45276, July 12 and 13, British Columbia), illustrate this plumage and the early appearance of the postjuvenal moult, the first and second primaries still growing while the seventh to the tenth have been already renewed.

First Winter Plumage, acquired by a complete postjuvenal moult, excepting the two distal primaries of each wing. A dress practically adult is assumed at this stage.

First Nuptial Plumage. — There is no material showing prenuptial moult, but it must be very restricted, judging by breeding

birds. Later plumages are repetitions of the winter and summer dress.

Dendragapus canadensis (*Linn.*). CANADA GROUSE.

Natal Down. — Above rusty buff with dusky mottling. Black spots at nostrils, on forehead, on lores and behind the eye. A rufous patch bordered with black on the occiput. Below pale straw yellow.

Juvenal Plumage, acquired by a complete postnatal moult. Very similar to the adult female dress but browner above, rustier on the crown, neck and throat, whiter on chin, and with the pattern of the flank feathers quite different. A bird in my collection (J. Dwight, Jr., No. 1367, ♂, Nova Scotia, August 9) shows new black, white-tipped body feathers laterally on the breast, the first of the winter dress. Of the remiges belonging to the juvenal plumage, the first and second are nearly matured, the third is worn and with the buff edging of this stage, the fourth is a mere pin point, the others up to the eighth secondary (the eighteenth remex) are new and the remainder old. The rectrices of the first winter are partly grown. The sexes are alike in this plumage.

First Winter Plumage, acquired by a complete postjuvenal moult. Young birds become practically indistinguishable from adults, the black areas, however, are less solidly black and the white edgings broader. October birds examined show no further signs of moult. It is of interest to note that the black feathers of the chin and sides of the head are basally white, those nearest the white markings, as the throat crescent and head spots, having the largest areas of white. Furthermore one web of the feathers situated at the side of the white areas may be white and the other black, — a point that is of more significance, as will be seen, in *Lagopus*. The amount of white in both genera is apparently greater in the younger birds.

First Nuptial Plumage. — I can throw no light on the subject of a prenuptial moult. August birds in my collection are much worn about the chin, the area most involved when moult occurs in allied species.

Second or Adult Winter Plumage, acquired by a complete post-

nuptial moult, nearly completed except on the neck and throat as early as mid-August. Two males (J. Dwight, Jr., No. 1365, Nova Scotia, Aug. 9, and No. 1393, Nova Scotia, Aug. 13) have already lost the old distal primaries, the new ones being still somewhat pulpy and little of the worn body plumage remains.

Later plumages are repetitions of those already described.

Dendragapus franklinii (*Dougl.*). FRANKLIN'S GROUSE.

I have seen no material which throws any light on the moult of this species.

Bonasa umbellus (*Linn.*). RUFFED GROUSE.
" " **togata** (*Linn.*). CANADIAN RUFFED GROUSE.
" " **umbelloides** (*Dougl.*). GRAY RUFFED GROUSE.
" " **sabini** (*Dougl.*). OREGON RUFFED GROUSE.

The material examined indicates precisely similar moults in all the races of this species. The renewal of the remiges by the postjuvenal moult begins when the birds are only about one half grown, a striking characteristic of all the Tetraonidæ, and I have been able to trace all the interesting stages of plumage in the young bird by a series of *Bonasa* that includes all sizes from the chick to the full grown bird. The moult of *Bonasa* is typical of the whole family of Grouse and Quails.

Natal Down. — Above chestnut, paler on the crown, mottled on the body; a dull black postocular line. Below pale buff or primrose yellow, brightest on the chin, and a faintly brownish collar. A downy chick of *umbellus* (Amer. Mus. No. 25344, New York, May 27) has eight primaries and nine secondaries with their coverts barely breaking from their sheaths; the first and second primaries and the inner secondaries are not yet visible.

Two chicks of *umbellus* (Amer. Mus. No. 51447, New York, May 30, and L. B. Bishop, No. 2889, Connecticut, June 3) are slightly more advanced. Another of *umbellus* (L. B. Bishop, No. 2946, Connecticut, June 29) shows the distal pair of primaries, the rest of the wings better grown and new body feathers coming in at the sides of the breast and on the back at the root

of the neck. A chick of *togata* (J. Dwight, Jr., No. 5964, ♀, Quebec, July 1) has the remiges well developed except the two distal and a few proximal. The tail is beginning to show as the rectrices push out the tufts of down surmounting them; the wing-coverts are well grown; and the sides of the breast are covered with new feathers which have also begun to appear in the anterior dorsal and lumbar regions and on the throat and crown. No. 5968, ♂, of the same brood, three days older, shows a little more tail and more feathers on the crown. No. 5978, ♀, of the same brood, eight days older, shows a couple of inches of tail and has already begun the postjuvenal moult of the primaries, the eighth, ninth and tenth having fallen out. The chin, throat, forehead, superciliary stripes and mid-abdomen are still downy.

Juvenal Plumage, acquired by a complete postnatal moult. It is at its full development when the birds are less than three quarters grown, the loss of the remiges by the postjuvenal moult beginning very early. This plumage is similar to that of the adult female, but is browner with paler and less distinct barring, the chin white instead of buff, the rectrices more distinctly barred, and the remiges with wider and more mottled outer webs. There are no neck tufts, males and females being practically indistinguishable at this stage. A specimen of *togata* (J. Dwight, Jr., No. 4166, ♂, Quebec, July 24) is not much more advanced than No. 5978, but is double the size and has very little down left on the chin. Two other males (J. Dwight, Jr., Nos 1363 and 1364, Nova Scotia, August 7,) have renewed the primaries from the tenth outward as far as the fifth, and the body feathers also of the first winter plumage are appearing on the breast laterally and on the back. Several other specimens in the American Museum are at about the same stage (Amer. Mus. No. 57877, Manitoba, August 6, and No. 55575, Wisconsin, August 24).

First Winter Plumage, acquired by a complete postjuvenal moult, except the two distal primaries. The full adult dress is assumed, males becoming distinguishable from females by the more prominent black neck tufts now acquired for the first time. A specimen of *togata* (J. Dwight, Jr., No. 224, ♀, New Hampshire, Sept. 10) has assumed this plumage except for the head and throat, and the third and fourth primaries, while buff-

spotted under wing-coverts have replaced the gray ones of the juvenal stage. Numerous October specimens examined have lost all traces of moult except in some of them on the border line between the breast and throat. The 'ruff' of young males is not so deep a black as that of adults and the barring of the lower parts is less extensive and somewhat paler, but plumage characters cannot be absolutely depended upon to distinguish young from old.

First Nuptial Plumage, acquired by a limited prenuptial moult confined to the head and chin. A specimen of *sabini* (Amer. Mus. No. 47282, British Columbia, June 2) shows numerous pin feathers on the chin, throat, sides of head and forehead. Another *sabini* (Amer. Mus. No. 47279, ♂, British Columbia, May 20) also shows a few pin feathers. A few other spring and summer birds of other races have been obtained too early or too late (*i. e.*, March or June) to show positive signs of moult.

Later plumages are repetitions of the winter and summer dress.

Lagopus lagopus (*Linn.*). WILLOW PTARMIGAN.
" " **alleni** *Stejn.* ALLEN'S PTARMIGAN.

The series of Ptarmigans in the American Museum of Natural History and in the U. S. National Museum, together with specimens from Alaska kindly loaned me by Dr. Louis B. Bishop, and a few in my own collection, illustrates most effectively all the plumages and moults of these Arctic birds. The study of this material, amounting to nearly two hundred specimens, now enables me to explain the parti-colored plumages of these birds, a matter that has long baffled investigation and given rise to a belief that the individual feathers themselves change color without being moulted. It has also been believed by some that Ptarmigans moult continuously and in a hap-hazard way during the whole year. All of these ideas have arisen from a misconception of the facts, which show that the feathers supposed to be changing color or pattern are of that particular color and pattern at the time they first expand, that the continuous moult resolves itself into definite periods, and that the feather growth is systematic, differing in no respect from that of the rest of the Grouse. The

one essential difference between the moults of the Ptarmigans and those of the Grouse is found in the extra moult in the autumn by which the brown feathers regularly assumed at the usual periods of moult in both young birds and old are replaced by white ones.

As for the prenuptial moult, it may or may not be more extensive than among the Grouse, the extent of renewal varying apparently with the latitude. Birds living in lands of eternal snow appear to assume very few dark feathers, chiefly about the head, as the brief Arctic summer sets in. Those of lower latitudes undergo a more extensive moult, which, however, never includes the remiges nor the rectrices. Besides this, as females seem to assume more dark feathers than do males, we are led to the conclusion that the Ptarmigans are a remarkable instance of protective coloration, and that their plumage is modified to suit their environment. We know them best in their winter dress, snow white with black rectrices hidden by white coverts, and can understand how readily they harmonize with a snowy landscape, being thus protected from their enemies. With the melting of the snow they don a dusky dress mottled with buff, which is confined chiefly to the upper parts. A little later the annual moult takes place, including practically the whole plumage, and a reddish brown dress is assumed upon the back, head and breast, the remainder of the body and the wings becoming white. An extra moult shortly after removes the brown feathers. If white were assumed everywhere at the time of the annual or postnuptial moult, which begins as early as July, it would not be protective; but why the postnuptial moult should not be postponed until white would be protective, is a theoretical matter that need not concern us. The salient fact is the occurrence of a moult similar to one characteristic of a number of the Ducks and observed, although not understood, many years ago. A description of it as noticed in the Mallard may be instructively read in this connection.[1] Further details of this moult among certain Ducks have been published by Mr. Witmer Stone[2] and Mr. F. M. Chapman.[3]

[1] Waterton, Loudon's Mag. Nat. Hist., VIII, 1835, p. 544.

[2] Proc. Acad. Nat. Sci. Phila., 1899, pp. 467–472.

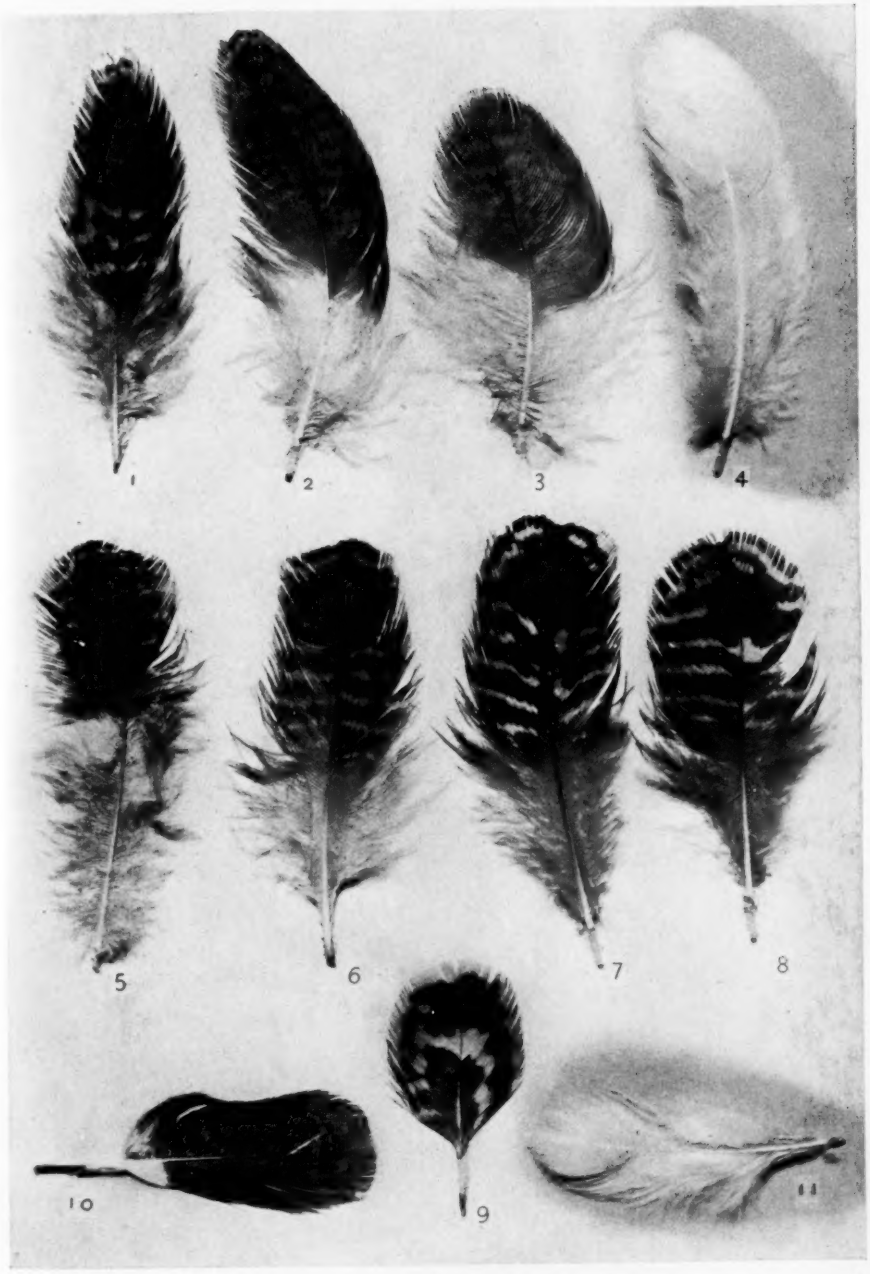
[3] Bull. Amer. Mus. Nat. Hist., XII, 1899, pp. 231–240.

This extra moult so quickly succeeds the one preceding it that new brown and new white feathers may be found almost side by side. If, however, we bear in mind how feather growth radiates more or less symmetrically from definite points, we can distinguish two moults rather than two stages of one, and if we could trace the history of each individual feather, we would doubtless find it subject to the same laws which govern the development of plumage in all species of birds. The difficulty arises of designating the intermediate stage of plumage by a name. It exactly corresponds to the 'autumnal' or 'winter' plumage of most birds, but part of it is soon renewed by the extra moult. It seems to me it might best be called the *preliminary winter plumage*, which, when the brown feathers have been replaced, becomes the *supplementary winter plumage*. One thing is evident — the brown or dusky stage does not properly belong to the nuptial or summer plumage, for its appearance is synchronous with the postnuptial renewal which begins among the remiges. Young birds also pass through a preliminary winter plumage following the juvenal, assuming by the postjuvenal moult a dress that is scarcely different from the corresponding stage of adult plumage, although the brown feathers acquired are fewer and more scattered. As in the adult, this plumage is also followed by a wholly white supplementary winter dress.

The plumages of the Ptarmigans are puzzling not only on account of the plumage intermediate between summer and winter dress, but also on account of the rapidity with which the moults follow each other, one beginning before the previous one is completed, and apparently overlapping it at some points. Moreover, the incompleteness of the partial moults with the irregular retention of feathers peculiar to them adds to the confusion of ideas resulting from seeing together an assemblage of feathers belonging to several different stages of plumage. As for the rapidity with which one moult treads upon the heels of another, it can only be said that the mode of life of the Ptarmigans requires it and the activity of a feather papilla is no greater than the necessity. As a matter of fact, some papillæ produce approximately one feather in May, another in July and a third in September, but there are many which produce but two feathers

during this period and others only one, while all of them are dormant during the long winters. The 'generations' of feathers are most frequent where the blood supply is richest. Problems of plumage solve themselves as soon as we can say when and where each feather grows, and a comprehension of the idea of sequence is the key to the whole matter.

Before taking up the series of plumages and moults in their natural order of development in the Ptarmigans, I wish to call attention to Plate IV which shows the four constant types of feathers found upon *Lagopus lagopus*. It is the mingling of the four that has proved a stumbling block to many observers. Fig. 1 represents one type, the juvenal plumage; Figs. 2, 3, and 10 a second type, the preliminary winter plumage; Figs. 4 and 11 a third type, the supplementary winter plumage; and Figs. 5–9 a fourth type, the nuptial plumage. That feathers of all of these types grow at definite times is amply shown by many of the series of birds examined and is illustrated by Figs. 9, 10 and 11 which show new feathers still clasped by their sheaths; but it must be remembered, there is some tendency for one type to run into another. My object is to indicate when and where these types grow and how they are modified in color and pattern by age, sex, individuals, and particularly by position. If observers would pay attention to a few of these matters first we would hear very little afterwards about color change without moult. The parti-colored feathers are principally on the line of demarkation between light and dark areas, and the same style of feathers will always be found upon corresponding areas of birds taken at the same stage of development. The feathers of the second type, for instance, always show an amount of white basally which varies with the position they occupy in the feather tracts. The white, too, is most extensive upon the webs nearest white areas, just as it is in *Dendragapus*, or any other species with contrasting colors. This may be seen by examination of the feathers of the mesial borders of the sternal bands of the ventral feather tract where dark parti-colored feathers largely tipped or variegated with white are regularly produced at the postnatal, postnuptial and prenuptial moults. The triangular wedge of ventral feather tract extending between the sternal bands produces only white feathers at the



PTARMIGAN FEATHERS.

FIG. 1. DOWN FEATHER OF PTARMIGAN.

FIG. 2. DOWN FEATHER OF QUAIL.

postjuvenal and postnuptial moults, such feathers appearing upon the sternal bands at a later period, namely, at the supplementary postjuvenal and supplementary postnuptial moults. There is no theory about any of these matters, — the facts are patent only they have not been understood. Nor is it an easy matter to understand them without following them in detail, but this is just what I propose to do, and I am glad to say the series I have examined forms a complete chain of plumages in which even the intermediate links of moult are not missing. It is only by tracing the development of the successive 'generations' of feathers peculiar to each feather tract and studying their relation to each other, that we may arrive at the true explanation of the apparently hopeless confusion of variously colored feathers found upon the Ptarmigans during the summer months. Instead of confusion we find each tract and each feather governed by the usual laws of feather growth, and the only confusion discoverable is that existing in the minds of those who have not grasped the facts. What these facts are I have already endeavored to sum up, but they will become still clearer if the reader will follow me through the pages which follow. As with the other Grouse and Quail the sequence of plumages and moults is illustrated by specimens studied in the natural order in which the plumages have developed. We will begin with *Lagopus lagopus*.

Natal Down. — Downy chicks are mottled above with rusty brown and dull black, the crown is chestnut and a dark line runs behind the eye; below they are a pale buff yellow. This down, shown in Plate V, from a photomicrograph by Dr. Edward Leaming, varies little upon different parts of the body or in different species of the Tetraonidæ. Fig. 1 represents it attached to the apex of a juvenal feather of *Lagopus lagopus* and Fig. 2 shows it similarly attached to a juvenal feather of *Colinus virginianus*, the former plucked from the humeral tract, the latter from the chin where the down is shorter. It is found not only at the apices of the body feathers but at those of the flight-feathers and of the rectrices, being practically continuous with the barbs of the succeeding feathers, the tips often breaking away with the confining band which gathers them into a bundle.

A downy chick (Amer. Mus. No. 26178, Labrador, July 1,

"five days old"), is just beginning to show the sprouting juvenal remiges, the outer ones being least developed. Another chick (Amer. Mus. No. 26179, Labrador, June 29, "twelve days old") has the wing-quills and coverts well out of their sheaths, and some of the brown rectrices are beginning to show, together with a few dusky, white-tipped feathers of the humeral tracts. Still another (Amer. Mus. No. 26177, Labrador, July 22) is slightly more advanced, new juvenal feathers expanding on the sides of the breast, anteriorly on the back, on the rump, and on the lumbar tracts, while eight primaries are partly grown, the first and second or distal pair of each wing not yet showing. Several specimens in the U. S. National Museum are well advanced into the next plumage and need not be particularly described.

Juvenal Plumage. — This dress is acquired by a complete postnatal moult beginning shortly after the chick leaves the egg and practically ends before the bird is more than half grown, the natal down persisting longest on the chin, throat, sides of neck and abdomen. This plumage is of the first type as shown by Plate I, Fig. 1, dusky above and variously barred, mottled and edged with rich ochraceous buff, many of the feathers being narrowly tipped with white, while a richer buff prevails below; the dusky markings are reduced to irregular bars, and to mere spots upon the chin and upper throat, where the buff is very pale and the feathers white basally as well as terminally. The abdomen (including the wedge of the ventral feather tract extending to the neck), the flanks, the crissum, the tibiæ, tarsi and toes become dull yellowish white, the flanks, crissum and upper part of the tibiæ being obscurely barred and having a rusty tinge. It should be noted that the feathers adjacent to the mesial borders of the sternal bands approach type two, being dusky, often finely mottled and showing basally and terminally large areas of white. Similar feathers also grow at the postnuptial moult scattered irregularly, chiefly along the external border of these bands, but the two kinds may be distinguished by the greater wear showing upon the earlier developed feathers. The juvenal remiges are grayish brown somewhat mottled with buff, except the two distal primaries which are white, sometimes speckled with dull black terminally. The late development of the first and second primary, usually long after the

third is grown, suggests the idea of classing them as part of the winter plumage. As, however, they belong to the series which develops before the postjuvenal moult begins, it seems best to class them with the juvenal dress, as I have consistently done in describing the other Grouse and Quails. The juvenal rectrices are deep brown barred with reddish brown and narrowly tipped with white. Males and females are practically indistinguishable in juvenal dress.

The early appearance of the postjuvenal moult when the birds are hardly half grown is not peculiar to the Ptarmigans, but the appearance of new white primaries at both ends of a brown series is confusing unless the origin of these feathers is thoroughly understood. Several birds illustrate this stage. One of them (Am. Mus. No. 26176, Labrador, July 22), hardly half grown and still downy about the head, has replaced the ninth and tenth juvenal primaries by white ones just breaking from their sheaths; the ninth is a mere pin point, while the white first and second are nearly grown and still pulpy, the brown third primary showing traces of its immaturity by the persistent scaly sheath at its base. Except about the head and throat the juvenal plumage of the body has been mostly acquired. Another bird, the date of capture lacking (Am. Mus. No. 45191, Labrador) is more advanced, the tenth primary being well grown and only the third to the sixth of the brown ones remain. The juvenal tail is still retained. Still another bird two thirds grown (Am. Mus. No. 26175) retains only the third and fourth of the brown juvenal primaries although juvenal feathers are still expanding on the back, head and throat.

First Winter Plumage (*preliminary*), acquired by a postnuptial moult which is generally very incomplete in birds of the far North, but more extensive in those of lower latitudes. A mere sprinkling of reddish brown finely vermiculated or mottled feathers of the type shown by Plate 1, Figs. 2, 3 and 10, may be acquired or the renewal may be complete, the abdomen, flanks, legs and feet, however, always assuming at this moult pure white feathers of the type shown by Figs. 4 and 11. The remiges except the two distal primaries, which are not moulted, and most of the wing-coverts are replaced by white ones. A few proximal remiges that correspond to tertiaries, and a couple of rows of

median coverts are not moulted until later, the postjuvenal moult overlapping in a measure the limited one succeeding it. The black tail tipped with white is acquired at the postnuptial moult, the median pair of rectrices being latest in development, the rest of the series all being renewed at nearly the same time. There are fourteen black rectrices. The two central feathers usually reckoned as rectrices appear to be in the row of coverts which they certainly follow in their moult, developing white and being renewed, when they are renewed, at a later period than are the black rectrices. The rectrices are moulted once in the year, the coverts often twice and a few of them three times.

Males and females in this intermediate plumage are not usually distinguishable, although the latter may be duller and with more tendency to barring, especially on the breast. A female scarcely full grown (Amer. Mus. No. 26173, Labrador, August 27) has assumed much of the preliminary plumage and is already beginning to show a few white feathers of the supplementary stage. Some body feathers of the juvenal stage are retained, including a few parti-colored ones on the inner margin of the sternal bands; the third primary is brown and also one feather of the alula. The tail is perhaps one quarter grown. New white feathers are growing systematically upon the abdomen, legs and toes, the points of first development for the toes being each joint. Two other birds (L. B. Bishop, No. 4503, ♀, and No. 4506, ♂, Yukon Delta, Alaska, August 28) are at about the same stage, but have assumed a few reddish feathers, chiefly on the breast. The first and second primaries have lost almost all traces of immaturity, the third has not been replaced and is brown, the fourth is only one half grown, and the fifth merely shows the remains of its sheath. At about the eighteenth remex partly grown feathers will be found, and the rest of the series is not yet renewed, but an exact count is extremely difficult in all dried and distorted wings. Worn parti-colored feathers occur on the sternal bands adjacent to the ventral wedge, which is beginning to be clothed with pure white feathers replacing yellowish ones, but these variegated feathers will be renewed when the moult just beginning at the anterior part of the sternal bands reaches them, as will the external barred buff feathers that sweep backward over the flanks. The advance of the

two moults practically side by side, apparently in three parallel bands, on the breast and abdomen may be traced in a number of specimens which illustrate it. A female (Amer. Mus. No. 26169, Labrador, September 5) has assumed wings almost wholly white; the third primary is a mere pin point, its brown juvenal covert still retained, and the inward course of the moult has reached the eighteenth remex. The new white one is just visible, the seventeenth half grown, and the inner members are as yet unmoulted. The median coverts and a few dusky lesser coverts are still retained. New white feathers are growing among the axillaries and upon the flanks and abdomen at the places where they regularly develop. Four other birds (L. B. Bishop, No. 4504, ♀, No. 4505, ♂, No. 4507, ♂, and No. 4509, ♂, Alaska, August 28) are at about the same stage or slightly more advanced. The third primary of each is now white and one half grown while they still retain a brown feather of the alula and some brown ones of the carpo-metacarpal border. In two others (L. B. Bishop, No. 4502, ♂, and No. 4508, ♂, Alaska, August 28) the white of the sternal bands is more prominent and the tails a little longer.

A female (L. B. Bishop, No. 4597, Alaska, Sept. 11) is still further along, white feathers beginning to appear about the chin and throat. Another bird (L. B. Bishop, No. 4657, Alaska, Sept. 19) has become almost wholly white on the abdomen except a few feathers of the flanks, and new white feathers of the supplementary winter dress are growing at the usual initial points of development on the breast, throat, chin, head and back. Three more (L. B. Bishop, No. 4655, ♂, No. 4656, ♀, and 4658, ♀, Alaska, Sept. 19) differ little from the last although the white middle pair of tail-coverts is now in sight taking the place of the juvenal feathers. A specimen evidently *alleni* (Amer. Mus. No. 45195, wrongly labelled "Nova Scotia, summer") illustrates the full development of the preliminary winter plumage, the wings being absolutely white although the inner remiges show signs of recent growth. The upper parts and breast are almost wholly of the reddish second type of feather, the abdomen wholly white, as are the flanks, legs and toes.

First Winter Plumage (*supplementary*), acquired by a partial supplementary postjuvenal moult, which beginning at the usual

points removes the brown feathers of the preliminary dress, together with such barred feathers as may have been skipped by the incomplete postjuvenal moult. As a result of the last two moults birds become wholly white except for the black rectrices, males and females being indistinguishable. Numerous winter specimens illustrate this plumage. In some cases brown feathers may persist throughout the long Arctic winter, which furnishes a period of rest from November to May, much needed perhaps after the active feather production of the short summer. A few specimens show this (U. S. Nat. Mus. No. 19887, ♀, Great Slave Lake, April 4; No. 93060, ♀, Alaska, April 1, and No. 94409, ♂, Labrador, March 21); the last is an unusual case with much brown. As old and young in full white plumage are indistinguishable except that adult males appear to have the crown feathers basally black, it can only be said that this dress is worn without change until April, as shown by several specimens (U. S. Nat. Mus. No. 50060, ♀, Nulato, Alaska, April 12; No. 31660, Ft. Anderson, Canada, March 17; No. 98033, Bergen, Norway, March 15; Amer. Mus. No. 26889, Norway, "end of March"), and others with no indication of prenuptial moult up to that date.

First Nuptial Plumage. — At the beginning of the brief summer which follows the long winter a partial prenuptial moult takes place, the extent of which appears to depend upon latitude, sex, and probably age. Part of the white body feathers are replaced by dusky or reddish ones, males assuming chiefly those of the type shown by Plate I, Figs. 5 and 6, the color being dull black barred or mottled with buff; females, those of the same type but more boldly barred with a richer buff, as shown by Figs. 7, 8 and 9. Females may now be distinguished with certainty from males for the first time by plumage characters, the barring being coarser and extending to the head, throat and breast, the feathers of which in the male are reddish brown, chiefly with narrow dusky terminal bands, and often tipped, on the chin especially, with white. It should be observed that parti-colored feathers basally or terminally white may be assumed at this moult on the internal borders of the sternal bands just as in juvenal dress, the abdominal wedge, flanks, legs and feet, retaining as a rule the white feathers of the winter plumage. The

white remiges and their coverts are always retained and often much of the rest of the wing plumage, the median rows of coverts being the ones renewed if any are. The tail-coverts may be renewed, but the fourteen black rectrices remain. More than fifty specimens, chiefly in the U. S. Nat. Mus., illustrate the acquisition of this plumage, by growth of new feathers, during April, May and June, some still sprouting in July even when those of the next stage have begun to appear. It is not easy to tell old birds from young. The early appearance of new feathers is shown by the following specimens: U. S. Nat. Mus. No. 98034, ♂, Norway, March 15; No. 93059, ♂, Alaska, April 11; No. 73217, ♂, May 1, Alaska; No. 93146, ♂, Alaska, May 21; No. 46082, ♀, Alaska, May 9, and others too numerous to mention. There are many June birds and of these may be mentioned two specimens (Amer. Mus. No. 26174, ♂, Labrador, June 2, and No. 26170, ♀, Labrador, June 8) which from their plumage appear to be year old birds and are still acquiring new feathers at a number of points although fairly clothed above with the nuptial dress, which has extended to the inner members of the remiges and the median coverts.

Second or Adult Winter Plumage (preliminary). — Even before the nuptial dress is fully acquired the postnuptial moult sets in, beginning a little prior to the postjuvenal and resulting in an intermediate plumage partly white and partly reddish brown which may hardly be told from that of young birds at the same season. It should be observed that the moult of the remiges now includes the two distal primaries which are retained in young birds. Adults, however, seem to be somewhat grayer with finer mottling or vermiculation upon feathers of the type shown by Plate I, Figs. 2, 3 and 10, those of the throat being of a deeper red-brown with less barring than those of young birds. Practically young and old, both males and females, are all indistinguishable except by inconstant differences when clothed by the preliminary winter dress, but their age and sex may usually be told by the left over tell-tale feathers of an earlier plumage. Several Labrador birds (Amer. Mus. No. 26167, ♂, July 15, No. 26168, ♂, July 22, No. 26171, ♀, July 14, and No. 26172, ♀, July 15) show the postnuptial moult beginning early in July, as

they have already assumed several new, partly grown inner primaries and a very few of the reddish brown body feathers. An Alaskan specimen (L. B. Bishop, No. 4501, ♀, August 28) has renewed eight of the ten primaries, the two outer ones being worn and dirty white by comparison, and part of the other remiges and the wing-coverts except the median rows. New reddish mottled feathers have grown, scattered on the back rump and among the upper tail-coverts; and reddish feathers basally white, varying with their location, have largely replaced the nuptial ones on the chin, throat, breast and sides. The growth of white feathers is well under way on the abdomen, flanks, legs and feet, and the later strips of supplemental white on the sternal bands have even begun to appear producing shortly, as in the young bird, the effect of a central band of white with two lateral bands. The outer feathers of the sternal bands are the last to be renewed, a condition found on a female (L. B. Bishop, No. 4598, Alaska, Sept. 11) with the first and second primaries not fully grown, and the rectrices not yet reaching beyond the coverts. The abdomen, flanks, legs and feet are white, as well as most of the sternal bands, and the white is extending to the breast, white feathers just expanding being found at the customary points on various areas. The head and throat are chiefly reddish mixed with barred nuptial feathers, which also persist to some extent upon the back where white feathers of the supplementary stage are beginning to show. A similar male (Amer. Mus. No. 26162, Labrador, Sept. 26) shows a greater number of white feathers of the supplementary winter dress, and the primaries are full grown. Two specimens of *alleni* (Amer. Mus. No. 25857, ♂, and No. 25858, ♀, Newfoundland, Sept. 15) also illustrate the preliminary winter plumage, having acquired a larger number of the reddish feathers than will be found on more northern birds, of which I have examined a large number from Labrador and Alaska. These birds, taken in various stages of plumage during July, August and September, illustrate the serial growth of feathers and the final acquisition of the pure white winter dress.

Second or Adult Winter Plumage (*supplementary*), acquired by a partial supplementary postnuptial moult, the beginnings of which

have been shown by the specimens described. Adults become wholly white, the females indistinguishable from young birds, but males apparently assume crown feathers which are basally black, gray prevailing in young birds. An Alaska specimen (Amer. Mus. No. 26180, ♂, October), indicates that the white dress may be acquired before November in that latitude; and this bird as well as others (*e. g.*, Amer. Mus. No. 26165, ♂, Labrador, December 20) show that basally black crown feathers grow in the autumn and are not white ones recolored in the spring.

Second or Adult Nuptial Plumage.—This is acquired, as in the young bird, by a partial prenuptial moult, doubtless extremely limited in high latitudes. The colors of adults are somewhat richer with a tendency to less barring and finer mottlings, at least in males. Two males (Amer. Mus. No. 49902, Great Slave Lake, Canada, June, and No. 26890, Archangel, Russia, May 5) illustrate new growth of feathers radiating from the usual points, the late renewal of the forehead and lores being excellently shown. The growth is confined wholly to the head, the rest of the bird being pure white. Numerous other specimens examined need not be here described, although illustrating the varying extent of the prenuptial renewal.

Later plumages and moults are but repetitions of those already fully explained in all details.

The wear of feathers in the Ptarmigans throws some light upon questions of plumage but they do not appear to suffer much from it and the rapid succession of the summer moult prevents marked abrasion or fading in most cases. As for the moult of the claws described by several observers, I need not discuss it in the present connection.

That the plumages are complicated and difficult to understand I am ready to admit, but I fail to find the slightest reason for supposing them to be produced otherwise than by moult. I may not have systematized the plumages or the moults in the best manner, but at least I have tried to bring out the facts in a way that I hope may clear up the misty ideas that have prevailed in spite of the plumages of the Ptarmigans having been the theme of so many writers.

Lagopus rupestris (*Gmel.*). ROCK PTARMIGAN.
" " **reinhardi** (*Brehm*). REINHARDT'S PTARMIGAN.
" " **nelsoni** *Stejn.* NELSON'S PTARMIGAN.
" " **atkhensis** (*Turner*). TURNER'S PTARMIGAN.
" " **townsendi** *Elliot.* TOWNSEND'S PTARMIGAN.

The series of Rock Ptarmigans and near allies, though smaller and less complete than that of *lagopus*, shows conclusively that there is an analogous sequence of moults and plumages. The dusky buff-barred juvenal and nuptial stages of plumage are followed by an intermediate stage when mottled dusky gray feathers are assumed more or less abundantly on the upper parts of the head and the breast, while coincidently the wings, abdomen, flanks, legs and feet assume a white plumage which is retained for a twelvemonth. The dusky gray plumage, however, is scarcely donned before a supplementary moult begins, radiating from the usual points of departure on the sternal bands, and from the numerous other points on the back and head where other moults regularly begin. This supplementary moult advances down the middle of each sternal band or a little to its inner side, beginning on the sides of the breast and radiating laterally, so that the mesial borders of these feather tracts lose their parti-colored feathers earlier than do the borders beneath the wing. There is usually only a sprinkling of feathers of the intermediate stage on these tracts, together with *two sorts* of feathers that originated at the previous postnatal or postnuptial moults, according to the bird's age, all of which are now replaced by the growth of new white ones, as presently are all dusky feathers elsewhere. A pure white winter plumage with black tail results from *two* moults just as in *lagopus*. No evidence of color changing without moult is to be found. At the beginning of the short Arctic summer a prenuptial moult of varying extent takes place, apparently birds of localities where the snow is ever present undergoing a very limited renewal of grayish dusky feathers. I have discussed the corresponding changes of plumage so minutely under *lagopus*, that I need not repeat here except for clearness. The remarks apply to *rupestris* except when otherwise specified.

Natal Down. — It is difficult to distinguish the chicks from those of *lagopus*, but they are usually paler and grayer.

Juvenal Plumage, acquired by a complete postnatal moult. Much duskier, and more barred, with less rusty tinge than the same stage of *lagopus*. Two birds, apparently *reinhardi* (Amer. Mus. Nos. 64133 and 64134, Greenland, July 28), about one third grown, still retain natal down on the chin, throat, mid-abdomen, legs and feet, but have already acquired four partly developed white proximal primaries of the winter dress. The first and second juvenal primaries are white, partly grown, the rest dusky. The juvenal brownish tail is not fully grown.

First Winter Plumage (*preliminary*), acquired by a fairly complete postjuvenal moult excepting the first and second primaries. The wings (except the median coverts and inner remiges) become white together with the abdominal wedge of the ventral tract and all posterior to it including the flanks, legs and feet; while the head, throat, breast, sides and back become more or less dusky according to the extent of the renewal in different individuals and probably according to the latitude. These feathers are of the type shown by Plate I, Figs. 2, 3 and 10, but dusky instead of reddish as in *lagopus*. The black rectrices are acquired at the postjuvenal moult.

A number of specimens show the later stages of this plumage with the quickly ensuing change into the wholly white dress. It will suffice to cite a few. One (Amer. Mus. No. 67883, Sitka, Alaska, Sept. 15) has completed the postjuvenal moult of the wing except the third primary which is only half grown. The dusky preliminary dress prevails above and on the head and throat, with white feathers of the supplementary dress appearing on the throat, chin, back, tail-coverts and sternal bands, the last largely renewed by the supplementary moult which has not yet reached some parti-colored juvenal feathers at one border and both juvenal and preliminary winter ones at the other. The white of the mid-breast, abdomen, flanks, legs and feet is part of the preliminary dress. Another (Amer. Mus. No. 64130, ♂, Greenland, August 26) is more advanced, showing many white feathers of the supplementary stage. Other specimens (Amer. Mus. Nos. 66878, 66881, ♀, and 66882, ♀, Alaska, Sept. 15) are

simply a little further advanced with the lower parts almost entirely white and numerous patches of white on the head and back, the third primary by its immaturity marking them as young birds.

First Winter Plumage (*supplementary*), acquired as already indicated by a limited supplementary postjuvenal moult which removes all dusky retained juvenal and preliminary winter feathers. Both sexes become white with black tails and indistinguishable from *lagopus* except in some young males which have traces of the black lores peculiar to adults.

First Nuptial Plumage, acquired by a partial prenuptial moult, the extent of which seems to vary with latitude, sex and individual. Birds dwelling where snow prevails the whole year acquire but few dark feathers, as indicated by a couple of males (L. B. Bishop, No. 4182 and No. 4183, White Pass, British Columbia, June 11), the latter wholly in worn white winter dress save for a few partly grown dusky feathers on the crown, the former with a few on the crown and a similar small patch on the throat. It is not possible to say how far this moult will extend, but the lateness of the date precludes extensive renewal before the postnuptial moult begins. Other birds assume a grayish finely vermiculated or mottled dress, retaining only the white remiges and their coverts, the black rectrices, the white legs and feet and a variable number of white wing-coverts and white feathers of the mid-abdomen. Females would seem to undergo a more extensive renewal than males, being coarsely mottled and barred with buff and black, and now distinguishable for the first time from males by their plumage.

Second or Adult Winter Plumage (*preliminary*), acquired by a postnuptial moult, probably less complete in higher latitudes. The early beginning of this moult is shown by three worn females of *reinhardi* (Amer. Mus. Nos. 64128 and 64129, July 28, and No. 67820, July 25, Greenland) which have acquired a few new primaries and some dusky body feathers. Males and females are practically alike in this preliminary dress, and differ little from young birds.

Second or Adult Winter Plumage (*supplementary*), acquired by a partial supplementary postnuptial moult, birds becoming wholly white with black tails. Males, however, assume jet black lores

which distinguish them from young birds and from females. The coming of this dress is illustrated by several September birds (Amer. Mus. No. 67877, ♂, and No. 67880, ♀, Alaska, September 15) which have recently acquired new first and second primaries at the end of the postnuptial moult and are assuming many new white feathers about the head and on the back, by the supplementary moult.

Second or Adult Nuptial Plumage, acquired by a prenuptial moult, limited to the body plumage, as in the young bird.

Later plumages and moults are similar to those already described and occur in definite sequence.

Lagopus evermanni *Elliot.* EVERMANN'S PTARMIGAN.
" **welchi** *Brewst.* WELCH'S PTARMIGAN.
" **leucurus** *Swains. & Rich.* WHITE-TAILED PTARMIGAN.

I have seen too few specimens of these species to enable me to trace their sequence of plumages and moults, but those I have examined indicate the same changes as in *lagopus* or *rupestris*. *L. leucurus* becomes absolutely white in winter, the tail being white at all seasons except in the gray juvenal stage.

Tympanuchus americanus (*Reich.*). PRAIRIE HEN.
" " **attwateri** (*Bendire*). ATTWATER'S PRAIRIE HEN.
" **cupido** (*Linn.*). HEATH HEN.
" **pallidicinctus** *Ridgw.* LESSER PRAIRIE HEN.

The usual sequence of moults and plumages prevails in this genus, the species of which need not be discussed separately.

Natal Down. — The bright tints of the lower parts of the chicks is characteristic, no other members of the Tetraonidæ approaching so nearly a canary yellow. Above they are mottled with rusty brown and dull black, spots of black also occurring on the nostrils, crown and behind the eyes. A chick of *americanus* (L. B. Bishop, No. 1968, North Dakota, June 12) shows the remiges and coverts partly grown, but the first and second primaries are not yet visible; elsewhere down prevails except a few juvenal feathers appearing in the humeral tracts. A chick of

attwateri (Amer. Mus. No. 59539, Texas, April 25) is similar but even younger.

Juvenal Plumage, acquired by a complete postnatal moult, which is overlapped by the postjuvenal moult before the birds are one half grown. This is illustrated by a young *americanus* (L. B. Bishop, No. 2070, North Dakota, July 5), which still retains natal down upon the head, throat, under surface of the wings, abdomen and legs. The first and second primaries are mere pin points, the third to eighth grown, the ninth a pin point and the tenth just expanding, the new ninth and tenth of course being part of the first winter plumage. The barred juvenal body plumage has been assumed elsewhere. Both males and females resemble adult females at this stage, being dusky above lined with white and barred with buff, the lower parts being dull white barred with dull black and buff, but neck tufts are lacking.

First Winter Plumage, acquired by a complete postjuvenal moult excepting the two distal primaries. Young and old become practically indistinguishable. A specimen of *cupido* (J. Dwight, Jr., No. 4370, ♀, Martha's Vineyard, Mass., Sept. 29) is almost wholly in this dress, new feathers however still expanding upon the chin and throat while the third primary is only half grown. The rest of the remiges except some inner members of the series show few signs of immaturity.

First Nuptial Plumage, acquired by a partial prenuptial moult, confined to the chin and head. A specimen of *attwateri* (Amer. Mus. No. 59538, Texas, April 25) shows a few new feathers growing among the old on the sides of the head.

Second or Adult Winter Plumage, acquired by a complete postnuptial moult.

Later plumages are repetitions of summer and winter dress.

Pediœcetes phasianellus (*Linn.*). SHARP-TAILED GROUSE.
" " **columbianus** (*Ord*). COLUMBIAN SHARP-TAILED GROUSE.
" " **campestris** *Ridgw.* PRAIRIE SHARP-TAILED GROUSE.

The material is limited, but it shows that the birds of this genus evidently moult like the other Grouse.

Natal Down.—Not seen.

Juvenal Plumage, acquired by a complete postnatal moult. Similar to adult female but grayer and the throat white instead of buff.

First Winter Plumage, acquired by a complete postjuvenal moult excepting the two distal primaries. Several specimens have doffed most of their juvenal dress, the last of it persisting about the chin and neck. One bird (Amer. Mus. No. 47297, British Columbia, August 25) retains only the third and fourth primaries and some inner secondaries; the first and second of the series as usual only partly grown.

First Nuptial Plumage, assumed probably by a limited prenuptial moult, but not shown by the series examined.

Second or Adult Winter Plumage, acquired by a complete postnuptial moult. Several British Columbia specimens, taken in August, show actual moult at various stages.

Later plumages and moults are repetitions of earlier ones.

Centrocercus urophasianus (*Bonap*). SAGE GROUSE.

The specimens examined were all taken in Wyoming in August, September and October and show the same stages of plumage as in the other Grouse. A young bird (Am. Mus. No. 64006, Wyoming, Aug. 15) is partly in juvenal dress, the first and second primaries not grown and the others already renewed by those of the winter dress except the third and fourth. An adult male (Amer. Mus. No. 64012, Wyoming, Aug. 25) has assumed new primaries excepting the distal two which are old and worn, the body plumage is partly renewed. An adult ♀ (Am. Mus. No. 64005, Wyoming, Aug. 15) has the four distal primaries old, the others new. The usual sequence of plumages and of moults undoubtedly takes place.

In conclusion I would say that as the subject of moult is to many a sealed book, I have gone into details and repetitions that may appear tedious, chiefly for the purpose of emphasizing the fact that moult is systematic no matter how varied the resulting plumage may be. Once let this idea be grasped and the most complex problems of plumage may be readily solved without recourse to theoretical explanations.

EXPLANATION OF PLATE IV.

All of these feathers are from the humeral tracts of specimens of *Lagopus lagopus*.

Fig. 1. Juvenal Plumage (Amer. Mus. No. 26169, ♀, Sept. 5).
" 2. Preliminary first Winter Plumage (from same specimen as Fig. 1).
" 3. Preliminary first Winter Plumage (Amer. Mus. No. 45195, no data).
" 4 and 11. Supplementary first Winter Plumage (Amer. Mus. No. 26889, ♀, March, and Amer. Mus. No. 26162, ♂, Sept. 26).
" 5. First Nuptial Plumage (Amer. Mus. No. 26168, ♂, July 22).
" 6. " " " (" " " 26174, ♂, June 8).
" 7 and 8. First Nuptial Plumage (Amer. Mus. No. 26172, ♀, July 15).
" 9. First Nuptial Plumage (Amer. Mus. No. 26170, ♀, June 8).
" 10. Preliminary second Winter Plumage (from same specimen as Fig. 6).

EXPLANATION OF PLATE V (PHOTOMICROGRAPHS).

Fig. 1. Neossoptile of Natal Down attached to tip of Juvenal Plumage feather (Amer. Mus. No. 26179, June 29, "12 days old") from humeral tract of *Lagopus lagopus*. (×20.)
" 2. Neossoptile of Natal Down (J. Dwight, Jr., No. 2044, ♀, October 5) from chin of *Colinus virginianus*. (×20.)

FURTHER NOTES ON LACÉPÈDE'S 'TABLEAUX.'

BY CHARLES W. RICHMOND.

IN PRESENTING some notes on the date of publication of the above paper in 'The Auk' (Oct. 1899, 325), I stated that Lacépède's bird genera, as well as several credited to Cuvier, should be properly quoted as "Lacépède, in Daudin, Traité," etc., instead of "Mém. de l'Inst. III, 1801," assuming that a certain preliminary paper (in quarto), containing these genera and supposed to have been published in 1799, could not be found. In this I was mistaken, for before the appearance of the October 'Auk' I received a letter from Mr. Sherborn announcing the discovery of a copy of this rare tract, which has recently formed the basis of a second communication to 'Natural Science' (Sherborn, Nat. Sci., Dec., 1899, 406–409).

The full title of this tract, quoting from Mr. Sherborn's account, is

"Discours | d'ouverture et de clôture | du cours | d'histoire naturelle | Donné dans le Muséum national d'Histoire naturelle, | l'an vii de la République, | et | Tableaux méthodiques | des mammifères et des oiseaux, | par le C^en^ Lacepède, | De l'Institut national de France [seven lines of titles, etc.] | a Paris | chez Plassan, Imprimeur—L'ibraire. | L'an vii de la Republique. | ."

These 'Discours' occupy 56 pp., followed by 18 pp. of mammifères and 20 pp. of oiseaux, the subheading for the latter being "Tableau des sous-classes, divisions, sous-divisions, ordres et genres des oiseaux."

Mr. Sherborn gives the date of this tract as late in 1799, a detailed review being given in the 'Journ. général de la Litt. de la France for Nivôse, An. VII. (Dec. 21, 1799, to Jan. 19, 1800). There is, however, no reference to it in the 'Journ. Typographique,' although Daudin's 'Traité,' Vol. I, is duly announced on 30th Nivôse (Jan. 19, 1800).

While the 'Discours' and the 'Traité' doubtless appeared within a few weeks of one another, and the contents of the bird 'tableau' is practically identical in each case, the former has a slight priority and should be quoted, notwithstanding its inaccessibility to the majority of ornithologists.

In November last, while looking over some books in the library of the Academy of Natural Sciences in Philadelphia, I found an incomplete copy (the bird matter only) of Lacépède's paper in a volume of tracts.

A perusal of this copy shows the following list of genera to be credited to Lacépède, with page references:

Touraco, p. 2.
Astur, p. 4.
Nisus, p. 4.
Buteo, p. 4.
Circus, p. 4.
Milvus, p. 4.
Tyrannus, p. 5.
Muscivora, p. 5.
Myrmecophaga, p. 6.
Cacicus, p. 6.
Picoïdes, p. 7.
Orthorhyncus, p. 9.
Ceyx, p. 10.
Tridactylus, p. 11.
Gouan, p. 12.
Pelecanoïdes, p. 13.
Prion, p. 14.
Urinator, p. 14.
Carbo, p. 15.
Hians, p. 17.
Ibis, p. 18.
Macrotarsus, p. 18.
Hydrogallina, p. 19.
Touyou, p. 20.

GENERAL NOTES.

Notes on the Genus Micruria. — In the 'Catalogue of Birds in the British Museum' (Vol. XXVI, p. 595) W. R. Ogilvie-Grant suggests that *Micruria craveri* may possibly be the breeding plumage of *M. hypoleuca*. That such is *not* the case I have abundant evidence in some fifty or more *hypoleuca* of both sexes which I have taken from the nest, all of which were perfectly characteristic in having pure white under wing-coverts. I have taken *hypoleuca* in every month in the year and have never yet seen an adult with gray or dusky under wing-coverts. On many of the islands off the coast of Lower California *M. hypoleuca* begins nesting in late January, though I have found fresh eggs as late as early April. Late in February they may be seen at sea in family parties consisting of the parents and one or two downy young, which are taken to the water the first night, I think, after they are hatched. The young stay in company with the adults until late in the year, and after June 1 I have never seen an immature bird that could be identified as such at gunshot range. During the second week in June, 1897, I fell in with a number of family parties of *Micruria* off Magdalena Bay, Lower California. An immature bird was shot and upon securing it I found the under wing-coverts smoky gray more or less tipped with white, though I *thought* I was sure that the parents were typical *hypoleuca*. In March, 1899, I was so fortunate as to find several nests of young only just from the egg; two of these are before me, and as regards color, they are exact counterparts of the adults, except that the wings are *sooty below* as well as above. The parents in this case were secured and identified beyond a doubt. Thinking that I had at last a clew to the status of *M. craveri* — a species I had begun to consider somewhat mythical — I sent my Magdalena Bay specimen to Mr. Ridgway for comparison with specimens of *craveri* in the National Museum. His reply is to the effect that the National Museum has but three specimens of *craveri* and the same number of *hypoleuca;* the former "are evidently old birds, being in worn plumage; one of them has nearly completed the moult and still has the dusky wing-coverts!"

Mr. Ridgway suggests that the plumages may possibly represent the two sexes, the sexing of the specimens in the National Museum supporting that supposition, the "*craveri*" being marked males and "*hypoleuca*" as females; or that they may be individual phases of one species. As for the first suggestion, I can say that my series does not bear out the theory, there being, so far as I can see, no tangible difference in the plumage of the sexes. As for the theory of individual variation, if that be the solution, "*craveri*" must be very rare indeed in the northern part of the habitat of the genus. I have taken possibly 75 specimens between the Santa Barbara Islands and Magdalena Bay, and seen a great many more. The only one I have ever taken that suggested in any way the plumage

known as *craveri* is the immature specimen above mentioned. In the light of the present material it would be unsafe to consider *craveri* as a synonym of *hypoleuca*, thought it is possible that it may prove to be a plumage of the young carried through one or more moults. — A. W. ANTHONY, *Taylorsville, Cal.*

Some notes on the Herring Gull (*Larus argentatus*). — The evidence that there is no such bird as *Larus argentatus smithsonianus* continues to accumulate. Doubts of the validity of this subspecies have been expressed before, both orally and in print. (*Cf.* Knight, Hist. of Birds of Me., p. 19; Maine Sportsman, July, 1898, p. 13; Journal of the Me. Orn. Soc., Oct. 1899, p. 37). These records refer to the occurrence in Maine of specimens referable to *L. argentatus*, and finally question the existence of any subspecific differences between American and European specimens. While in Portland a short time ago I had occasion to visit the shop of a local taxidermist and noticed a large number of these birds which he had skinned for sale to milliners. After carefully examining fully 100 specimens, which had been shot in Portland Harbor and vicinity, I was delighted to find ten specimens which were, as regards the first primaries, typical examples of *L. argentatus*. Three of the birds had the first primary entirely white at the tip without any trace of a black bar or dot, and the others had the black bar only slightly indicated. Other specimens had the black bar more complete, and a perfect series of gradations could be found between adult birds with only white on the apical part of the first primary and birds having a black bar half an inch wide near its extremity. The non-existence of the so-called subspecies *L. a. smithsonianus* seems to be completely demonstrated. At the same time I had the opportunity of examining a large number of Kittiwake Gulls and found a greater variation in their primaries than in those of the Herring Gull. In both cases specimens examined for comparative purposes were adult birds. — ORA W. KNIGHT, *Bangor, Me.*

Ring-billed Gull in New Hampshire. — Thanksgiving Day, 1898, at Campton Village, N. H., I was invited to a country store to see a strange bird that had recently been made a captive. Upon examination it proved to be a Ring-billed Gull (*Larus delawarensis*) — evidently a young bird. It had first been seen at Waterville, N. H., where it was shot through one wing and then captured.

Thanksgiving Day, 1899, while driving through West Campton, I was surprised to see a Gull chasing a large flock of hens. Upon inquiry I learned that this was the Gull previously seen that had now spent one year in captivity. Its plumage seemed in good condition and the bird apparently enjoyed good health.

So far as I can learn this is the first Ring-billed Gull to enter the New Hampshire bird list. — ELLEN E. WEBSTER, *Franklin Falls, N. H.*

The Cinnamon Teal in Louisiana. — There are three comparatively late records of the occurrence of the Cinnamon Teal (*Querquedula cyanoptera*) in the State of Louisiana; all of these are from the southeastern part of the State, though the bird might be reasonably expected to be much more frequent in the western parishes. The first record was of a pair taken in December, 1884, on the western shore of Lake Pontchartrain, close to New Orleans. They were collected by a professional hunter, at that time in the employ of Prof. G. E. Beyer, of Tulane University. These specimens were sent to the State University at Baton Rouge, and have since been lost sight of.

In December, 1893, Mr. A. Perilliat shot two females on Lake Cattawatchie, about fifteen miles from New Orleans. These were mounted by Prof. Beyer, and are now in Mr. Perilliat's possession.

The third record, of a single male, was obtained at St. Malo, on Lake Borgne, the first week in January, 1900. This specimen, a very dark one, shot by a hunter named Rafael Robin, passed into the hands of Mr. G. A. Nelson, and was donated by him to the Tulane University Museum. — ANDREW ALLISON, *Tulane University, New Orleans, La.*

An Interesting Hybrid. — An exceedingly interesting hybrid between a Mallard (*Anas boschas*) and Pin-tail (*Dafila acuta*) was shot near New Orleans on February 18, by a professional hunter. It was presented to the Museum of Tulane University, and is now mounted and incorporated into the ornithological collection.

The specimen is not only unique on account of the distribution of the external male characteristics of the two species of ducks, but also on account of the perfect development of the sexual organs themselves, which, especially at this time of the year, should hardly be expected in the normal male of any species of duck. The testes were exactly five-eighths of an inch in length, by three-sixteenths of an inch in diameter. Microscopic examination of both the testes as well as the seminal ducts revealed apparently normal and fecundising fluid.

The general outline of the bird itself is that of the male Pin-tail with the exception of the length and thickness of the neck, which is more like that of the Mallard.

The head in general is rather heavy and compact; in color it is a mixture of the violet iridescence of the Pin-tail with the green of the Mallard; the crown and bill, however, in color as well as shape, are strictly Pin-tail, as are the wings, on which the speculum is rather of a brighter green than is ordinarily found in that duck, and resembles more the speculum of the male Green-winged Teal.

The rest of the upper parts are those of the Pin-tail also, whereas the lower parts are those of the male Mallard. The distribution of colors on the neck, however, is not symmetrical, for the right side is Pin-tail, and the left exhibits the characteristic chestnut of the Mallard, extending from the chest up to the somewhat broader white ring.

The tail presents the most curious blending of the two species, the two middle curled tail-coverts of the male Mallard, while still curled, are enormously lengthened, and now resemble the two long middle tail feathers of the Pin-tail; the middle tail feathers themselves are nearly as long as in the latter duck, but the rest of the tail is really Mallard. The crissum, again, is Pin-tail, and the orange-red feet are, in shape and color, as in the Mallard. — GEO. E. BEYER, *Tulane University, New Orleans, La.*

The Roseate Spoonbill in Kansas. — A specimen of this Southern bird was captured by a party of gentlemen from Wichita who were fishing on the Walnut River near Douglas, Butler County, Kansas, in April, 1899. The specimen is in the collection of Mr. Gerald Volk, of Wichita. It has not previously been reported from Kansas. — D. E. LANTZ, *Chapman, Kan.*

Breeding of the Little Black Rail (*Porzana jamaicensis*) at Raleigh, North Carolina. — In view of Dr. Allen's account of this rare bird in the last number of 'The Auk' I was interested to see recently a set of eggs in the collection of Miss Jean Bell of Ridley Park, Pa., which seems not to be recorded. Inquiry as to the history of these eggs brought from the owner of the collection the following manscript notes of Messrs. H. H. and C. S. Brimley, which I was urged to publish. In doing so I wish to express my obligations both to Miss Bell and to Messrs. Brimley, to whom of course all credit belongs, my idea in publishing being merely to add to our knowledge of the bird in question.

"The Little Black Rail nests regularly here [Raleigh, N. C.] in the wet meadows lying along Walnut Creek, choosing for that purpose only those portions of the meadows covered with long grass, and building its nest in such situations in a grass tussock, either where the water actually stands among the grass or close to such a situation. The nests have never been found among cat-tails or bull-rushes or in the dryer portions of the meadows. The nests are found by the farm hands when cutting grass in the meadow, the nest being usually cut into and the eggs more or less injured before the cutter sees the nest. One such nest we found ourselves, all the others have been found and the eggs brought to us by farm hands. The following is a list of sets found at Raleigh:

"1. May 26, 1890. Five eggs in the nest and three of them broken; eggs fresh, nest of grass.

"2. June 8, 1892. Eight eggs, one destroyed; incubation advanced.

"3. June 16, 1892. Seven eggs, one broken; incubation about half completed.

"4. June 3, 1893. Eight eggs, two destroyed; incubation half completed. Nest cup-shaped, of dead cat-tail leaves and coarse grass.

"5. June 28, 1894. Eight eggs, one destroyed; fresh.

"6. July 12, 1894. Seven eggs; incubation advanced. Nest in tussock of coarse grass, made of dead grass and bull-rush leaves.

"7. August, 10, 1898. Six eggs; small embryos."—H. H. & C. S. Brimley.—WITMER STONE, *Academy of Natural Sciences, Philadelphia, Pa.*

Breeding of the Little Black Rail (*Porzana jamaicensis*) in New Jersey in 1844 and 1845.—Soon after the above note was written, by a curious coincident I came across a definite account of the breeding of this bird in New Jersey. Apart from a bare statement of the fact in Turnbull's 'Birds of East Pennsylvania and New Jersey,' the record seems not to have been published.

The facts are contained in letters written by Chas. C. Ashmead of Philadelphia to Prof. Baird, and for the privilege of publishing them I am indebted to Miss Lucy H. Baird. The extracts relative to the Black Rail are as follows:

July 28, 1844.—"My brother-in-law has just arrived from the seashore. Not long since he found a nest of the Black Rail; it was on a *fresh* water meadow near the seaside, and contained four eggs. He also caught the bird."

Oct. 2, 1844.—"I have the eggs of the Black Rail, also the full-plumaged male bird, in my possession."

Nov. 17, 1845.—"Tom Beesley has found another nest of the Black Rail, making the third he has found. The two first nests he found, one early in June, 1844, with four eggs; one early in June, 1845, with three eggs; and the last one about the middle of August, with but one egg in the nest. He had killed the bird before he found the nest. All three of the nests were found on the same spot of ground,—a fresh marsh on the banks of the Great Egg Harbor River, and not more than one fourth as big as the College Campus [at Carlisle]."

The locality was evidently Beesley's Point, and a brief mention of the spotting on the bird leaves no doubt of its identity. The fact, however, that Mr. Ashmead and his brother were constantly at the Academy at this time, and in daily association with Mr Cassin, would preclude the possibility of any error in identification. The discovery that this obscure little bird still breeds in this locality is well within the limits of possibility.—WITMER STONE, *Academy of Natural Sciences, Philadelphia, Pa.*

Occurrence of Tringa fuscicollis in Virginia in Autumn.—During a visit to the Eastern Shore of Virginia in company with Dr. William C. Rives, Sept. 21–28, 1899, a specimen of the White-rumped Sandpiper was secured near Chincoteague, Va., on the sand flats lying inside the beach of Assateague Island on Sept. 24. The bird was shot as it flew past with a flock of Semipalmated Sandpipers, among which it was conspicuous by reason of its larger size. It was the only individual of this species observed on the trip. This species appears in Dr. Rives's 'Birds of the

Virginias' in the hypothetical list. It was definitely recorded from Smith's Island, Northampton County, by Mr. Edw. J. Brown, who secured three specimens between May 14 and 28, 1894.

The present note is, we believe, the first definitely recorded instance of the species for Virginia in autumn. The specimen secured is a female. — WILLIAM C. BRAISLIN, M. D., *Brooklyn, N. Y.*

A Further Note on the Specific Name of Falco regulus. — Since the tentative proposal to change the specific designation of this species (Auk, April, 1899, p. 182), both the references to supposed earlier names have been verified and their status determined. One of these names, *Accipiter merillus* Gerini (Orn. Meth. Dig. 1767, I, 51, pll. xviii, xix) is, under present rules, untenable, for Gerini is clearly not a binomialist, as is disclosed by even a casual examination of his volumes. Since the other name, *Falco æsalon* Tunstall (Orn. Brit., 1771, p. 1), proves to be a nomen nudum, the Merlin apparently must continue to stand as *Falco regulus*.— HARRY C. OBERHOLSER, *Washington, D. C.*

The Arctic Three-toed Woodpecker in Beverly, Mass. — On January 21, 1899, I observed a pair (male and female) of the Arctic Three-toed Woodpecker (*Picoides americanus*) in the white-pine clumps of Beverly Commons; the female busily chiselling for grubs in a fallen trunk. She seemed wary, but hungry enough to allow of approach within twelve or fifteen feet, and continuous observation for ten minutes. With a good field-glass I could trace the passage of the grub when gulped down her gullet. She chiselled with great rapidity and skill, making the chips fly vigorously. The male meanwhile was perfectly quiet on a neighboring living trunk; so that his presence was unsuspected till the female, finally scared, flew to his tree and disturbed him into motion. Both then bounded off through the air with whirr of wings, the female leading. This record must be pretty far south for this species, especially in such a mild and open winter. Both birds were sleek and plump. — REGINALD C. ROBBINS, *Boston, Mass.*

The earliest name for the Roadrunner. — A recent note on the early history of the Roadrunner (Auk, Jan. 1900, 66) by the late Dr. Coues, suggests a point bearing on the proper name for the species. It is more than probable that Lesson's term *californiana* (1829) should be replaced by *longicauda* of Swainson (1824), but this is a matter which cannot at present be satisfactorily determined. On reference to Swainson's 'Classification of Birds,' II, 1837, 325, it will be noted that he quotes "*L. longicauda* Sw. (1824)" under the genus *Leptostoma*. Now, the name *longicauda*, for this Cuckoo does not occur in any accessible work of Swainson's of the year 1824, but it will almost certainly be found in his 'Appendix' to Bullock's Catalogue of his [Bullock's] Mexican Museum, published in that year. This work is so scarce that, apparently, no copy is now accessible to orni-

thologists. In addition to the Roadrunner it is probable that many of the species now credited to the Phil. Mag. 1827, were first described here.

Swainson's 'Appendix' ought to be as worthy of recognition as A. A. H. Lichtenstein's 'Catalogus Rerum' (1793), or Leach's 'Systematic Catalogue' (1816), or H. Lichtenstein's 'Preis-Verzeichniss' (1830), and should a copy come to light it is to be hoped that, like the works just mentioned, it may be reprinted for the benefit of ornithologists. — CHARLES W. RICHMOND, *Washington, D.C.*

The Red-headed and Other Woodpeckers in Michigan in Winter. — On reading the note in 'The Auk' for January, 1900, page 67, entitled 'The Red-headed Woodpecker near Chicago, Ill.,' by G. S. Mead, of San Francisco, Cal., I wish to say that the presence of the Red-headed Woodpecker (*Melanerpes erythrocephalus*) during the winter months in Michigan does not depend upon the temperature, but entirely upon the food supply, viz.: the crop of acorns and beechnuts which precedes the winter. If these nuts are plenty, the Red-headed Woodpecker will always be found during the winter months, but in no great abundance. If there are no acorns or beechnuts, this bird will be entirely absent in our Michigan forests. The Red-headed Woodpecker is therefore one of those peculiar birds whose migrations depend upon circumstances, viz.: the abundance of proper food; and this will be found characteristic of some of the rest of the family (Picidæ), namely, the Red-bellied (*Melanerpes carolinus*) and the Golden-winged Woodpecker (*Colaptes auratus*), which are sometimes found with us during the whole year, and sometimes they are absent during the winter months. The only bird of this family which I have *not* observed during the winter months is the Yellow-bellied Woodpecker (*Sphyrapicus varius*), which subsists almost entirely upon the sap and inner bark of trees, preferably the hard maples and the Austrian and Scotch Pines, which are usually found planted in lawns and parks. The Yellow-bellied Woodpecker makes his appearance in Michigan about the first of April when the sap is in full flow, and you will always find him on the park or lawn doing great damage among the Austrian and Scotch pines, in some cases entirely girdling and ruining the trees. This is the only member of this family that should *not* be protected by law. — JAMES B. PURDY, *Plymouth, Wayne Co., Michigan.*

The Flicker Wintering in Montreal. — On January 14, 1900, while walking with a friend along the woods at the foot of Mount Royal, I was surprised to see a Golden-winged Woodpecker (*Colaptes auratus*) fly from a tree within a few feet of us; it alighted on a sumac near by and began to feed on the seeds. We had a good view of it for a short time, until it flew into some low bushes and disappeared.

We saw one near the top of Mount Royal on November 25, 1899, which was, perhaps, the same bird, this being an unusually late date for its occurrence. The winter here has been milder than usual, but I have

never heard before, even in mild seasons, of *C. auratus* wintering so far north. — J. B. WILLIAMS, *Montreal, Can.*

Chuck-will's-widow in Kansas. — Prof. D. E. Lantz kindly informs me that the specimen of the Chuck-will's-widow (*Antrostomus carolinensis*) taken at Wichita, Kan., as recorded by me in a footnote to p. 187 of 'The Auk' for April, 1889, is really the specimen recorded by him on the same page, which was sent to Prof. Dyche for confirmation of the identification, and by the latter forwarded to me. — J. A. ALLEN, *Am. Mus. Nat. History, New York City.*

Otocoris alpestris praticola at Ipswich, Mass. — On October 26, 1899, at Ipswich, Mass., with Dr. Walter Faxon and Mr. G. M. Allen, I took a male Prairie Horned Lark out of a flock of four birds (two others were also seen later), the other three appearing to be of the same race. The specimen taken seems of especial interest, as its measurements and paleness make it approach very nearly to *arenicola*, — the specimen being almost intermediate as it is. Mr. Harry C. Oberholser and Mr. William Brewster, and all who have examined the bird, are of the opinion, however, that it is perhaps nearest *praticola*, and must be called such. Geographically of course, the bird is *praticola*, for if *arenicola* it is a straggler far out of its usual range. — REGINALD HEBER HOWE, JR., *Longwood, Mass.*

The Red Crossbill Unusually Common at Portland, Maine, in Summer. — During the early summer of 1899, Red Crossbills (*Loxia curvirostra minor*) were numerous about the west end of Portland, Maine, — a section of the city in which there is still a good deal of land devoted to gardens and lawns, and which contains a hill-side park with a large grove of pines. I returned to Portland from the south on June 2. The birds were then everywhere in evidence about my neighborhood, but mainly because of their vociferousness. They were quite elusive, and I found it difficult to estimate their numbers except from the noise they made. It was not until July 1 that I saw a large number together. On that morning, I counted twenty-eight in one open flock which flew slowly over me as I stood in the middle of a wide lawn. On the afternoon of that same day I left Portland for the summer. — NATHAN CLIFFORD BROWN, *Portland, Me.*

White-winged Crossbills in Rhode Island. — It may be of interest to Rhode Island ornithologists to record the taking of White-winged Crossbills (*Loxia leucoptera*) at Neutaconkanut Hill, Johnston, R. I., Jan. 14 and 30, and at Pawtuxet on the 1st, 2d and 24th of February. — EDWARD H. ARMSTRONG, *Providence, R. I.*

White-winged Crossbills and Brünnich's Murres in Central New Hamp-

shire. — Central New Hampshire has recently been visited by some rare birds for the locality. White-winged Crossbills (*Loxia leucoptera*) have previously been watched for in vain for thirty years by one of our best bird students, but he found them in comparative abundance this year and they have been seen by many other observers. Doubtless there have been stray individuals of this species here before, but their numbers at this time are particularly worthy of note.

A stranger visitation, however, has been a flock of Arctic sea birds. The last of November, 1899, a friend brought me a bird for identification that had been caught alive on land several miles from water, but it lived only a few days in captivity. I found it to be a Brünnich's Murre (*Uria lomvia*). Soon I learned that three others had been shot on one of the bays of Lake Winnipesaukee. The finest specimen was mounted, but the other two were used for the purpose of testing Gen. Greeley's statement that their flesh was excellent — the best flavored of any of the Arctic sea fowl. The report of the New Hampshire sportsmen was that roasted Murre tasted about as much like fowl as a smoked herring tastes like fish.

Still another Brünnich's Murre was seen to fly into a brush heap at Franklin Falls, where it was easily captured, uninjured. The captors, supposing they had a young Loon, took the bird to Webster Lake, three or four miles away, and, tying a string to the bird's leg, they hoped to observe some interesting feats in diving. In this they were disappointed, but the bird *swam* so vigorously that the string was broken and the bird's liberty was almost gained when, I am sorry to add, a shot from a gun ended its career.

Several other Brünnich's Murres have been reported and, so far as I can learn, it is the first time they have been taken here.

It has been said that if, by mischance, this bird should alight on land, it cannot always rise on wing to make its way by flight back to water. Is this statement correct? — ELLEN E. WEBSTER, *Franklin Falls, N. H.*

Ontario Bird Notes. — **Gavia arctica.** BLACK-THROATED LOON.—A female was taken on May 22, 1899, off Mimico (a suburb of Toronto), in Lake Ontario. The bird is in immature plumage, slightly abraded; the only previous record for Toronto is that of a pair sent to the Paris Exhibition of 1867.

Phalacrocorax carbo. CORMORANT.—A male was taken in Ashbridge's Bay, Toronto, on November 21, 1896. The bird was evidently starving and in a very bedraggled condition; it was killed with a brick by some boys. The Double-crested Cormorant is a regular migrant but this is the first true Cormorant I have seen from Toronto.

Histrionicus histrionicus. HARLEQUIN DUCK.—A female was taken at the Eastern Sandbar, Toronto, on October 20, 1894. The Harlequin Duck can be regarded as only a straggler on Lake Ontario. I have the records of three more specimens taken here in recent years; two immature males and a mature female.

Rissa tridactyla. KITTIWAKE.—Several were taken about Toronto in November, 1899.

Strix pratincola. AMERICAN BARN OWL.—A specimen was captured alive on a coal dock near the bay-front, Toronto, on September 7, 1899. The bird died soon afterwards and proved to be a male. This is the only Toronto record I am aware of, certainly the only one in recent years.

Pelecanus erythrorhynchus. AMERICAN WHITE PELICAN.—A male was shot on May 27, 1899, in the western bend of Lake Nipissing, Ontario.—JAMES H. FLEMING, *Toronto, Can.*

New Brunswick Notes.—It is evidently news to ornithologists that the American Robin (*Merula migratoria*) should be a winter resident in New Brunswick, yet such is without a doubt true. A big-game hunter informed me that about a large spring near the headwaters of the Nepisiquit River Robins were seen about the 20th of December, 1898. In the latter part of March, 1899, this locality was again visited and the Robins were there to the number of about fifty.

The Robins leave this locality (Scotch Lake) late in October or early in November, returning generally in the first week of April, but sometimes in the latter part of March. This locality is situated about 46° N., quite a distance south of the Nepisiquit.

A Turkey Buzzard (*Cathartes aura*) was captured in March, 1898, in Victoria County, N. B., and another seen at Keswick, York County, N. B., the same spring.

A Mourning Dove (*Zenaidura macroura*), a very rare bird here, was taken near Fredericton, Oct. 14, 1899.—WILLIE H. MOORE, *Scotch Lake, York Co., N. B.*

Bird News from Central New York.—In the three years which have elapsed since my last communication to 'The Auk' I have been able to add three new species to our list of Oneida County Birds, which with *Icteria virens*, recorded by Mr. W. J. B. Williams on page 331 of Vol. XV, bring the total for our vicinity up to 247. These three are:

Numenius hudsonicus. HUDSONIAN CURLEW.—A specimen of this bird, sex unknown, was shot on Verona Beach, Oneida Lake, by Egbert Bagg, Jr., Sept. 5, 1899.

Strix pratincola. AMERICAN BARN OWL.—About the middle of September, 1898, Mr. Charles L. Smith of Utica was driving in the adjoining town of Marcy, when he saw an Owl in a tree beside the road. While he was watching the bird, it left its perch and flew to a neighboring barnyard where it proceeded to "chase the chickens." Mr. S. left his horse and went to the rescue of the chickens, expecting to see the Owl fly away, but instead, it sought safety under the barn (perhaps having been there before). Mr. S. crawled in after the bird and captured it alive and took it home with him. He kept it alive for some time but finally

had it killed, mounted and placed in the store window, where I saw it and obtained from Mr. Smith this account of its curious capture.

Wilsonia mitrata. HOODED WARBLER. — Mr. W. R. Maxon finds this species every summer on the west slope of the "Stockbridge Hills," a few miles from the village of Oneida. He has observed them during the breeding season for three years and on June 24, 1898, secured a fine male in full plumage.

In addition to these new records the following seem worthy of mention:

Charadrius squatarola. BLACK-BELLIED PLOVER. — Between September 5 and 7, 1899, Egbert Bagg, Jr., and a companion killed several birds of this species on Verona Beach, Oneida Lake. Our second record.

Ardetta exilis. LEAST BITTERN. — I killed a young bird at Verona Beach, Sept. 1, 1898, and another was killed in the same town in the fall of 1897. Additional records. This bird may safely be put down as not uncommon near the western border of the county.

Tringa bairdii. BAIRD'S SANDPIPER. — A young bird was shot on Verona Beach by Egbert Bagg, Jr., Sept. 4, 1897, and a second specimen at the same place Sept. 5, 1899. Our only previous knowledge was Mr. Henshaw's record at Locust Grove in 'The Auk,' Vol. II, page 384.

Colinus virginianus. BOB-WHITE. — Mr. W. R. Maxon writes me, "On June 11, 1897, a covey of young Quail, able only to run, was observed near Sherrill, Oneida Co. A few Quail remained all last summer (1897) in the neighborhood of the Oneida County house, where they were observed frequently by Mr. Percy Klock. Additional records.

Accipiter atricapillus. AMERICAN GOSHAWK. — This bird is not uncommon in Hamilton County, where I have observed it for several years during the month of May, and where I had the pleasure of taking a nest on May 9, 1898. This is our first breeding record.

Ammodramus savannarum passerinus. GRASSHOPPER SPARROW. — Mr. W. R. Maxon finds this bird common in the hills south of Oneida. He has taken several specimens in successive summers. Additional records.

Pipilo erythrophthalmus. TOWHEE. — A pair was taken in the town of Vienna, about two miles northeast of the village of North Bay, July 8, 1897. Our fourth record, but all the others were migrants.

Dendroica cærulea. CERULEAN WARBLER. — June 24, 1898, Mr. Maxon found these birds to the number of 25 or more inhabiting a piece of woods about five miles south of Oneida. He secured three specimens. In June, 1899, he found them in the same place and took two more. We had one previous record from Clinton.

Harporhynchus rufus. BROWN THRASHER. — July 8, 1897, I found these birds very common a few miles northeast of North Bay in the town of Vienna, evidently resident. Entered before as "occasional." — EGBERT BAGG, *Utica, N. Y.*

Some Necessary Changes in Nomenclature. — *Pan* (Richm. 1899, vice

Tetragonops, preoccupied) being preëmpted (Oken, Mamm. 1816), as I am informed by Dr. T. S. Palmer, the genus of Barbets formerly known as *Tetragonops* may be called *Semnornis*,[1] with *S. rhamphastinus* (Jard.) as the type. *Semnornis frantzii* (Scl.) of Costa Rica, is the only other species at present known.

Geothlypis velata (Vieill. 1807) should give way to *G. cucullata* (*Sylvia cucullata* Lath., Index Orn. II, 1790, 528) of earlier date. The Mexican species recently described by Salv. and Godm. (Ibis, 1889, 237) as *Geothlypis cucullata* thus requires a new name, and it is with pleasure that I propose that of *Geothlypis nelsoni*, after Mr. E. W. Nelson, who has so thoroughly explored Mexico in the past few years.

The Wryneck of South Africa, commonly called *Iynx pectoralis* Vigors (P. Z. S. Aug. 5, 1831, 93), should properly be known as *Iynx ruficollis* Wagler (Natürl. Syst. Amphibien, 1830, 118, footnote).

Phyllostrephus terrestris Swains. (Birds of Western Africa, I, March, 1837, 270, footnote) is the correct name for the species now known as *P. capensis* (Swains. Classif. Birds, II, July, 1837, 229).

Melanobucco Shelley, 1889, should give way to *Lybius* Hermann, 1783 (Tabula Affin. Anim., 217, 235), with 'Le Guifso Balito' of Buffon (*Loxia tridactyla* Gmel.) as type. The species of this genus are: *Lybius bidentatus* (Shaw), *L. æquatorialis* (Shelley), *L. melanopterus* (Peters), *L. levaillantii* (Vieill.), *L. macclounii* (Shelley), *L. leucocephalus* (De Fil.), *L. albicauda* (Shelley), *L. abbotti* (Richm.), *L. senex* (Reichenow), *L. leucogaster* (Bocage), *L. tridactylus* (Gmel.), *L. torquatus* (Dumont), *L. torquatus congicus* (Reichenow), *L. zombæ* (Shelley), *L. irroratus* (Cab.), *L. vieilloti* (Leach), and *L. undatus* (Rüppell).

Pithys Vieillot, 1823, for a genus of Ant Thrushes, is antedated by *Manikup* Desmarest (Hist. Nat. des Tangaras, text to pl. 66), 1805. The type is *Manikup albifrons* (Gmel.), with a subspecies *Manikup albifrons peruviana* (Tacz.).

Crypturus pileatus (Bodd. Dec. 1783, or later) is antedated (without doubt) by *Tinamus soui* Hermann, Tabula Affin. Anim., 1783, 164, 235, and the species will thus become *Crypturus soui* (Hermann). — CHARLES W. RICHMOND, *Washington, D.C.*

An Interesting Bit of Manuscript.—I have elsewhere explained how part of the edition of the Birds of the U. S. Exploring Expedition by Peale, was burned and that owing to the very small number of copies published, the volume became very scarce, especially in Europe where it was in great demand. The plates, which really did not appear until Cassin's edition of the Report came out, were supposed at the time to have been issued with Peale's volume.

In this connection the following inscription in Bonaparte's writing is of much interest. It is written on the cover of a copy of Bonaparte's 'Notes

[1] **Σεμνός**, solemn; **ὄρνις**, bird.

sur Les Larides' ext. de la Rev. et Mag. de Zool., 1854, which I picked up in an old book store in Philadelphia. "Titian Peale, Esq., Zoologist, etc., from his friend the author. How can I manage to get a copy of the Am. Expl. Exp. Zool. in exchange or sale? The Plates have not yet reached Europe." Below in Peale's hand is "Rec'd June 14, 55. T. R. P." —WITMER STONE, *Academy Natural Sciences, Philadelphia, Pa.*

RECENT LITERATURE.

Keeler's Bird Notes Afield.[1] — Mr. Keeler's charming book on California birds consists of a series of thirteen essays well entitled 'Bird Notes Afield,' with an Appendix (pp. 235 – 353) containing 'A Descriptive List of California Land Birds with Key.' The titles of the essays — 'A First Glance at the Birds,' 'Patrolling the Beach,' 'A Trip to the Farallones,' 'A Day on the Bay Shore,' 'A Glimpse of Birds of Berkeley,' 'March in the Pine Woods,' 'Summer Birds of the Redwoods,' 'In a Mission Patio,' etc. — indicate very fairly what may be expected in 'Bird Notes Afield,' if we add that they are written by a sympathetic bird lover, who is withal an excellent field ornithologist, possessing the literary ability to tell gracefully and charmingly of the bird life of California fields, seashore and mountains. The first essay, 'A First Glance at the Birds' (pp. 1–52), is a general review of the birds of the State, which, as a brief popular account, is one of the best pieces of this kind of bird literature we have ever read. The style is attractive, and the narrative replete with the enthusiasm of a true bird-lover, who writes because he has something to say. The other essays are all in the same vein, and each by itself would be perhaps equally attractive, but as they were apparently written for special occasions and separate publication (several of them had appeared before and are here republished), there is naturally some repetition, as where the same species, appearing in several different essays, is repeatedly referred to in much the same language. But this is a slight fault, noticeable only on reading the book through consecutively.

The 'Artificial Key' to the California Land Birds is based primarily on color, the birds being divided into five primary groups on this basis. Each group is subdivided into sections, under which the species are arranged by their most striking features of difference, with a reference to the page where each is more fully described, in the systematic order of

[1] Bird Notes | Afield | A Series of Essays on | the Birds of California | By | Charles A. Keeler | — | D. P. Elder & Morgan Shepard | San Francisco | 1899. — 12mo. pp. i – viii + 1–353. $1.50.

the A. O. U. Check-List. The number of species thus formally treated is 204. This is the first work of the kind on the birds of any part of the Pacific coast-region, and should be of great aid to "those who," as the author says, "wish to have an introduction to our familiar birds in their native haunts," for whom the book is especially intended. The omission of an Index, however, in a book of this character, is a grave fault, and a rare one, fortunately, in the bookmaking of to-day. — J. A. A.

Russell on Birds of the Northwest Territory. — Mr. Frank Russell's 'Explorations in the Far North'[1] contains a list of birds collected by him during two years spent in the Northwest Territory. The chief points at which collections of birds were made are Grand Rapids, on Lake Winnipeg, at the mouth of the Saskatchewan River, Aug. 30, 1892, to Feb. 20, 1893; Crow Nest Pass, Alberta, April, 1893; Fort Chippewyan, at the western end of Lake Athabasca, May 15 to June 15, 1893; Fort Rae, on the northern arm of Great Slave Lake, July, 1893, to May, 1894, and Herschel Island, on the Arctic Coast, July and August, 1894. Mr. Russell's adventurous journey was undertaken for the purpose of securing collections in all departments of natural history, including especially ethnology as well as zoölogy, ornithological work thus receiving only a portion of his attention. The list of birds, however, numbers 122 species, and adds much interesting information on the birds of the extensive regions visited by the author. Instead, however, of combining all of his observations into a single list, it would have been more convenient for the reader, seeking definite information regarding particular localities, if he had divided the list so as to give a separate enumeration of the species found at each locality. It would have made a little repetition as regards a few species, but the geographical clearness thus gained would have much more than compensated for a little loss of space.

We note that the list records the capture of two specimens of the European Widgeon (*Anas penelope*), — one at Grand Rapids, Lake Winnipeg, Sept. 1, and one at Fort Rae, Aug. 22, which, taken in connection with the small number of Ducks reported as taken, seems quite remarkable. As we also note that the list records the capture of two specimens of *Spizella pallida* at Fort Rae, and a specimen each of *Spizella socialis arizonæ* and *Sayornis phœbe* at Fort Chippewyan, while *Contopus richardsoni* is not mentioned, it is difficult to give quite as full confidence to the Widgeon records as would be otherwise natural. Also it is at least unexpected that his 52 specimens of Redpolls, taken at various points from Lake Winnipeg to Herschel Island, should all be referable to *Acanthis linaria*, this being also the only species of *Acanthis* given in the list. Both species of *Sco-*

[1] Explorations | in | the Far North | By | Frank Russell | — | Being the Report of an Expedition under the | Auspices of the University of Iowa | during the years 1892, '93, and '94 | — | Published by the University | 1898. — 8vo. pp. i–ix, + 1–290, map, and numerous half-tone plates. Birds, pp. 253–270.

lecophagus are given as "abundant" in May at Fort Chippewyan, and the White-crowned Sparrow, found at Fort Rae, is recorded as *Zonotrichia intermedia*. While some of these records are surprising, to say the least, and possibly, with some others not here mentioned, may require revision, great credit is due Mr. Russell for the successful accomplishment of a most difficult journey, often under circumstances requiring a high order of courage, determination, and intelligence, and the Iowa University is to be congratulated upon the very substantial returns, in the way of collections and information, that have resulted from the young explorer's efforts as its representative. — J. A. A.

Loomis on California Water Birds. — Part IV[1] of Mr. Loomis's notes on California Water Birds relates to observations made off the coast of Monterey, September 18 to November 14, 1896. For nearly two months almost daily trips were made upon the ocean from the Hopkins Seaside Laboratory at Pacific Grove, and a summary of each day's observations is given (pp. 278–303). Then follow his 'Conclusions,' and finally a formal list of the species observed. The 'Conclusions' relate to the subject of migration, and treat of 'Migration Southward after Breeding Season,' 'Guidance by Physical Phenomena,' 'Guidance by Old Birds,' and 'Cause of Migration.' Especial attention is called to the fact that certain species of Petrels and Shearwaters found in our northern waters in summer breed either in the southern hemisphere or in the tropics. Mr. Loomis, in view of his experiences with the water birds off the California coast, has reached the conclusion that they are guided in their movements by the shore line and its prominent landmarks, and that in their sea journeys they may be able to direct their course by the currents and winds, and possibly by "celestial phenomena." He also considers it "reasonable to conclude that the young in the journey from their birthplace to the winter home of the species are dependent upon the guidance of the old birds who know the way because they have traveled it." "The causes of migration" he considers to be (1) "physical or outward," and (2) "psychological or inward." "In fine, it is maintained that winter, past and present, with its failure of food is the outward cause of all migratory movement." The "psychological or inward" cause of migration resolves itself into 'Inheritance,' 'Education' and 'Habit.' "It is not unreasonable" he says, "to suppose that there exists in migratory birds an inherent desire for travel and an inherited talent for geography. The ease with which birds find their nests in chaparral or in a sea of tules manifests that they possess memory of direction and locality in a remarkable degree. In migratory

[1] California Water Birds. No. IV, Vicinity of Monterey in Autumn. By Leverett M. Loomis, Curator of the Department of Ornithology. Proc. California Acad. Sci., Third Series, Vol. II, No. 3, pp. 277–322, pl. xv (map). Issued Feb. 12, 1900.

birds this faculty may attain higher development, becoming a talent for geography. The restlessness sometimes displayed in seasons of migration by wild birds reared in captivity is perhaps indicative of an incentive to travel. But here heredity seems to end and *education* to begin, for there appears to be guidance by old birds and guidance by physical phenomena..... Intelligence and habit remain to account for the constancy of migratory birds to time and place..... In short, it is believed that the causes of migration are simple facts and not impenetrable mysteries lying beyond the domain of scientific enquiry..... To sum up the whole matter in a single sentence: It is held that bird migration is a habit evolved by education and inheritance which owe their origin and perpetuation to winter with its failure of food."

Doubtless few careful students of migration will disagree with Mr. Loomis in respect to the propositions above quoted, and very few of the points raised have the interest of novelty, they having been in the main stated before by Mr. Loomis, and independently by others. But he gives us very little satisfaction, and nothing new, on the subject of what prompts the return migration. What he has to say on this point (mainly in a footnote on p. 315) is a rather weak attempt at destructive criticism of the views held by others.

The annotated list (pp. 317–322) of birds observed off Monterey during the two months of observations forming the occasion of the present paper numbers 42, several of which, however, were seen but once or twice; the bulk of the birds met with were a few species of Gulls, Shearwaters, Ducks and Phalaropes. Among the Shearwaters, Buller's Shearwater (*Puffinus bulleri*) is recorded for the first time as a North American bird, on the basis of a specimen captured by Mr. Loomis off Point Pinos, Nov. 6, 1896. It is also the fourth specimen known to science, the others, including the type, having been taken in New Zealand waters. "It may be confidently expected," says Mr. Loomis, "that persistent observation off Monterey will add to the list of pelagic wanderers from austral regions." — J. A. A.

Stone on 'The Summer Molting Plumage of Certain Ducks.'[1] — The collection of Arctic birds recently made at Point Barrow, Alaska, by Mr. E. A. McIlhenny, includes large series of various species of Eiders which have formed the basis of Mr. Stone's observations here detailed. Mr. Stone finds that there is a supplemental summer plumage, or post-nuptial dress, in not only the King Eider, the Pacific Eider, the Spectacled Eider, and Steller's Eider, but also in the Red-breasted Merganser. It has also been recorded as occurring in the Pintail and in various other species of Ducks in which the males and females are markedly different in coloration, and the inference is that this double summer moult is general among

[1] The Summer Molting Plumage of Certain Ducks. By Witmer Stone. Proc. Acad. Nat. Sciences Phil., 1899, pp. 467–472. Separates issued Dec. 1, 1899.

the Ducks in which there is a marked sexual difference in plumage. This post-nuptial plumage "is mainly restricted to the head, neck, breast and scapulars," and is acquired just prior to the loss of the flight feathers at the regular annual post-breeding moult; it is of dull tints, and rather loose structure, and is worn for only a few weeks, or during the period when the birds are unable to fly, through the loss of the flight-feathers by moult. "At such a time," says Mr. Stone, "a dull blended plumage would naturally be important in rendering the bird inconspicuous and thereby protecting it, and such I think is the explanation of this curious molt." Mr. Stone has here for the first time clearly described this temporary post-nuptial plumage and suggested its rôle in the economy of the species. As will be noticed later (see p. 186) Mr. Chapman has, independently and almost simultaneously, described this plumage in the King Eider and the Greenland Eider.—J. A. A.

Stone on a New Race of Short-eared Owl. — Mr. Stone finds [1] that a series of Short-eared Owls from Point Barrow, Alaska, in Mr. McIlhenny's collection are much paler than birds from Pennsylvania, and on this basis he has named the Point Barrow birds *Asio accipitrinus mcilhennyi*. — J. A. A.

Bangs on Colombian Birds. — Mr. Bangs has recently published two additional papers on the birds of the Santa Marta district of Colombia, based on collections made by Mr. W. W. Brown. The first [2] relates to a small collection made at San Sebastian, in June and July, 1899, at altitudes ranging from 6600 to 9000 feet, on the opposite side of the Sierra Nevada de Santa Marta from the points where his previous collections were made. The list numbers 29 species, six of which had not been previously taken by Mr. Brown, one of the latter, *Acestrura astreans*, being described as new.

The second paper [3] relates to the two species of *Henicorhina* found to inhabit the Sierra Nevada de Santa Marta region of Colombia, namely, the wide-ranging *H. leucophrys* and *H. anchoreta*, the latter here described as new, and as living in the higher parts of the mountains, at 11,000 to 12,000 feet, and above the range of *H. leucophrys*. — J. A. A.

Chapman on New Birds from Venezuela, etc. — A small collection of

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[1] A New Race of Short-eared Owls. By Witmer Stone. Proc. Acad. Nat. Sciences Phila., 1889, p. 478. Separates issued Dec. 29, 1899.

[2] On a Small Collection of Birds from San Sebastian, Colombia. By Outram Bangs. Proc. New Engl. Zoöl. Club, I, pp. 75–80, Dec. 27, 1899.

[3] The Gray-breasted Wood Wrens of the Sierra Nevada de Santa Marta. By Outram Bangs. *Ibid.*, pp., 83, 84, Dec. 27, 1899.

birds made by Mr. F. W. Urich in northern Venezuela,[1] and numbering only 37 species, proved on examination to contain 5 that were apparently undescribed, namely: (1) *Setophaga verticalis pallidiventris*, (2) *Chlorospingus* (*Hemispingus*) *canipileus*, (3) *Mecocerculus nigriceps*, (4) *Mecocerculus urichi*, (5) *Synallaxis striatipectus*.

Mr. Chapman has also described two new subspecies of *Colymbus dominicus*,[2] an examination of this group in the light of the material in the American Museum of Natural History showing that there are two continental forms quite different from true *C. dominicus* of the West Indies. To the South American form (type locality, Chapada, Matto Grosso, Brazil) he has given the name *C. dominicus brachyrhynchus*, in allusion to its very small bill, and to the North American form (type locality, Lomita Ranch, Lower Rio Grande, Texas) the name *C. dominicus brachyptera*. — J. A. A.

Chapman on Birds from Greenland.[3] — The American Museum of Natural History has received various collections of birds from Greenland during the last few years, in connection with the work of the several Peary Expeditions to North Greenland. These collections aggregate about 500 specimens, and include several especially interesting series of plumages of Eiders, Gyrfalcons, Murres, Kittiwakes, etc., which Mr. Chapman in the present paper has turned to good use. The number of species represented is 48, and many of them are accompanied by the field notes of one of the collectors, Mr. J. D. Figgins, who accompanied the Peary Expedition of 1896. Unfortunately, the field notes for the Expedition of 1895, when one of the most important collections was made, under the supervision of Prof. L. L. Dyche, were unavailable for use in the present connection.

Mr. Chapman gives special attention to the growth and phases of plumage in such species as Brünnich's Murre, the Kittiwake, Fulmar, Greenland and King Eiders, and the Gyrfalcons, several of which are represented by series illustrating all the changes from the downy chick to the fully adult birds.

Incidentally, Mr. Chapman takes up the question of the relationship of *Rissa tridactyla* to *R. t. pollicaris*, and finds that while the development

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[1] Descriptions of Five Apparently New Birds from Venezuela. By Frank M. Chapman. Bull. Am. Mus. Nat. His., XII, 1899, pp. 153–156. Aug. 5, 1899.

[2] Description of Two New Subspecies of *Colymbus dominicus* Linn. By Frank M. Chapman. Bull. Amer. Mus. Nat. Hist. XII, 1899, pp. 255, 256. Dec. 23, 1899.

[3] Report on Birds Received through the Peary Expeditions to Greenland. By Frank M. Chapman. Bull. Am. Mus. Nat. Hist., Vol. XII, 1899, pp. 219–244. Dec. 23, 1899.

of the hind toe in the two forms fails to be satisfactorily diagnostic, the difference in the amount of black tipping the outer primaries in the two forms is fairly constant and of sufficient importance to warrant their recognition as subspecies.

On the other hand, the extensive material of the Fulmar group leads Mr. Chapman to believe that the alleged differences between *Fulmarus glacialis* and *F. g. minor* are "ascribable to sexual and individual variation." In the case of *Somateria mollissima* and *S. m. borealis* he finds a marked difference in the size and form of the bill in the two forms, as shown by his measurements and outline figures, enough to warrant their recognition as well marked forms.

In describing the changes of plumage in the King and Greenland Eiders, Mr. Chapman distinguishes a post-nuptial plumage in the adult males, which begins to replace the nuptial in June, and affects all the brighter part of the plumage, and which in turn gives place to the breeding dress, reacquired during late autumn.

Mr. Figgins's field notes add great interest to the paper, and relate to the haunts and breeding habits of a large number of the species. — J. A. A.

Oberholser on the Flammulated Screech Owls.[1] — In a paper of sixteen pages, Mr. Oberholser has summarized our present knowledge of *Megascops flammeolus* and its western subspecies *M. f. idahoensis*. The former ranges from Guatemala to California, Arizona, and Colorado, and the latter from southern California to Washington and Idaho. Each form is described in detail, with full citation of bibliographic references, and such information on their habits and distribution as the scanty records thus far afford. A new record for *flammeolus* is Presidio County, Texas, while additional records for *idahoensis* are San Gorgonio Peak and the San Bernardino Mountains, California. In view of the considerable amount of variation shown by specimens from different localities, Mr. Oberholser believes that when more material is available the group will "be found separable into several more or less segregated geographical races." — J. A. A.

Oberholser on a Collection of Birds from Liberia.[2] — This collection consists of 57 specimens, representing 39 forms, four of which are here described as new, namely: (1) *Dendromus caroli arizelus*, (2) *Anthreptes*

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[1] The Flammulated Screech Owls, *Megascops flammeolus* (Kaup) and *Megascops flammeolus idahoensis* Merriam. Par M. Harry C. Oberholser. Ornis, Bull. du Comité Ornithologique International, Vol. X, No. 1, Dec., 1899. (Separate, 16 pp., repaged.)

[2] A List of the Birds collected by Mr. R. P. Currie in Liberia. By Harry C. Oberholser, Assistant Biologist, Department of Agriculture. Proc. U. S. Nat. Mus., Vol. XXII, 1899, pp. 25–37.

idius, (3) *Dicrurus modestus atactus*, (4) *Fraseria prosphora*. Two new genera, *Horizocerus* and *Stelgidillas*, are also characterized, and a specimen of the rare Hawk, *Dryotriorchis spectabilis* is reported, the ninth specimen of this species thus far known. — J. A. A.

New Birds from the Bahamas. — Mr. C. J. Maynard, in an 'Appendix to Catalogue of the Birds of the West Indies' (which Catalogue we have not yet seen) has published (Nov. 29, 1899) descriptions of four new species of birds from the Bahamas, namely; (1) *Colinus bahamensis*, from the island of New Providence; (2) *Speotyto bahamensis*, from "New Providence and probably Eleuthera"; (3) *Dendroica bahamensis* ("similar to *Dendroica vigorsii*"), from New Providence; (4) *Hæmotopus* (sic) *pratii* (provisional name), from Flemming's Key. — J. A. A.

Kopman on the Bird Fauna of Two Sections of Louisiana.[1] — This paper gives a comparison of the representation of 67 species in contiguous but very different portions of southern Louisiana, the fertile alluvial coast district and the pine barrens to the northward. These two areas are separated by the chain of lakes formed by Lake Maurepas, Pontchartrain and Borgne, and mark an abrupt transition from the alluvial fertile district, with its deciduous arboreal vegetation, to the pine districts, or 'pine barrens,' which extend from the eastern border of Louisiana into Mississippi. While scarcely a dozen species are restricted to either of these areas, the relative number of individuals of birds which are common to both varies so greatly as to form a strong contrast in the general ornithological character of the two regions, obviously due to the difference in vegetation and coincident conditions of environment. The birds listed for comparison are mainly the commoner summer residents. — J. A. A.

Faxon and Hoffmann's Birds of Berkshire County, Mass.[2] — Berkshire County, Massachusetts, differs so much from the rest of the State in altitude and other physical conditions as to form a well-marked region, and one, moreover, until recently ornithologically very imperfectly known. With a general altitude of 1500 to 2000 feet, and with peaks rising from 2400 to 3500 feet, the general character of the fauna and flora is distinctly more boreal than that of that portion of the State to the eastward. For many years ornithologists were left to conjecture as to the birds frequenting the higher parts of 'The Berkshires.' As early as 1884, however, definite

[1] The Bird Fauna of Two Sections. By Henry H. Kopman. The Gulf Fauna and Flora Bulletin, Vol. I, No. 2, pp. 50–57. Dec. 15, 1899.

[2] The Birds of Berkshire County, Massachusetts. By Walter Faxon and Ralph Hoffmann. Coll. of Berkshire Hist. and Sci. Soc., Vol. III, No. 2, pp. 109–166. Also separate, 8vo, pp. 60. Issued Feb. 23, 1900.

information on the subject began to be a matter record, when Mr. Brewster published his list of 66 summer birds observed in the vicinity of Greylock Mountain (Auk, I, 1884, pp. 5–16), and five years later this was materially supplemented by Mr. Faxon's lists of the birds of Sheffield (76 species) and Greylock (80 species, Auk, VI, 1889, pp. 39–46, 99–107), and by Mr. Hoffmann's still later paper on the summer birds of Central Berkshire (Auk, XII, 1895, pp. 87–89). The present paper presents the the combined results of these and other observations on the birds of Berkshire, the authors having made numerous visits to the region for the purpose of studying its bird fauna, not only in summer, but also in winter, spring and autumn.

While the list is admittedly incomplete, especially as regards the larger migrants and the winter stragglers, it presents all the information at present available on the subject, and is doubtless essentially complete as regards the summer birds of the region. The list, copiously annotated, numbers 197 species, with 4 additional subspecies, or, excluding the House Sparrow, just 200 forms. The first six pages contain a general account of the varied topographic and biologic characteristics of the region. Greylock is described as rising above the surrounding country like "an island of northern vegetation," and on its top have been found birds "whose normal habitat is the edge of the tree line of the loftier northern mountains," while in the Housatonic Valley a few southern or 'Carolinian' species find their way northward from southern Connecticut. A bibliography of several pages shows "the published sources of information available for the purposes of the list." The authors have chosen to impress upon their work a certain stamp of individuality by adopting an order of arrangement inverse to that of the A. O. U. Check-List, and in spelling a few of the technical names according to their particular preferences. The list appears to be a 'hard-and-fast' one, so far as it goes, every doubtful record being rigidly excluded, and, as already said, as complete as present knowledge renders it possible to make it.—J. A. A.

'Birds in Horticulture.'—In an address read before the Illinois State Horticultural Society,[1] Mr. Wm. E. Praeger makes a very good presentation of the facts in the case as regards the utility of birds to the horticulturist. He does not ignore the appropriation by certain birds of more or less fruit, but brings forward in offset the evidence of their extreme utility to the agriculturist at nearly all seasons, based on the investigation by competent experts of the general food habits of the species charged with injury to the crops. His conclusion is that in the case of the great majority of birds the good they do is so great and the harm, if any, so trifling that they should be encouraged and protected at all times.—J. A. A.

[1] Birds in Horticulture. By Wm. E. Praeger. A paper read before the State Horticultural Society at Springfield, Ill., Dec. 26, 1899. 8vo., pp. 12.

Stark's Birds of South Africa. Volume I.[1] Thirty-three years ago appeared Mr. E. L. Layard's 'The Birds of South Africa,' published at Cape Town in 1867, a new edition of which, revised and augmented by Dr. R. Bowdler Sharpe, was brought out in London, 1875–84. Layard's unpretentious first edition was for many years a most useful handbook on South African birds, and for many years was the only one available for English readers. It was greatly amplified and modernized by Dr. Sharpe, but, through the rapid progress of our knowledge of South African ornithology, it had again fallen behind and was becoming antiquated when Dr. Stark took up the work, for which he was so well fitted through his intimate personal acquaintance with the birds in life, acquired during many years of research and extensive travel in South Africa.

It is greatly to be regretted that before his task was finished he should have fallen a victim in the unhappy strife now raging in that country. After spending some time in London last year to see his first volume through the press, he returned to South Africa in September. On the outbreak of hostilities, he joined the medical staff of the British Army as a volunteer, and on Nov. 19, 1899, was killed at Ladysmith by a shell. Apparently the second volume was not well advanced, as 'The Ibis' for January, 1900 (p. 220), says: "We fear that it will be very difficult to find anyone to continue the work for which our much-lamented friend was specially competent from his long personal studies of the birds of South Africa in their native wilds."

The present volume "is the first of a series in which it is proposed to give an account of the Fauna of Africa south of the Zambesi and Cunéné Rivers," under the general title 'The Fauna of South Africa,' and under the editorship of Mr. W. L. Sclater, Director of the South African Museum at Cape Town. The birds will occupy several volumes, of which the first, here under notice, includes about one half of the Passerine birds. In the general plan and arrangement, the Bird volumes are similar to Mr. Eugene Oates's 'Birds of British India.' The classification adopted, as regards the higher groups, is that proposed by Dr. P. L. Sclater in 1880, which divides birds into 21 orders. The subdivisions of the South African Oscines are mainly as proposed by Dr. Sharpe in 1891, and include 20 families, of which 12 are treated in the present volume, and include 182 species and subspecies. Of these 3 belong to the family Corvidæ, 16 to the Sturnidæ, 3 to the Oriolidæ, 60 to the Ploceidæ, 23 to the Fringillidæ, 29 to the Alaudidæ, 19 to the Motacillidæ, 16 to the Nectariniidæ, 1 to the Certhiidæ, 4 to the Promeropidæ, 4 to the Zosteropidæ, and 6 to the Paridæ.

The bird life of South Africa is, of course, of a strikingly different type from that of North America, the families prevailing there being entirely

[1] The | Birds of South Africa | By | Arthur C. Stark, M. B. | Vol. I. | With a map and illustrations | London | R. H. Porter | 7 Princes Street, Cavendish Square, W. | 1900 — 8vo, pp. i–xxx + 1–322, 80 text cuts.

unrepresented with us, although shared with other parts of the Old World. The sixty species of Weaver Birds described in the present volume, the thirty species of Larks, the sixteen species of Starlings, and the sixteen of Sunbirds form five ninths of the birds treated in the present volume. Of these only the Larks have any American representatives, the genus *Otocoris*, alone of this immense family of more than 120 species and subspecies, reaching America. The Ploceidæ are practically 10 primaried Finches, but uniformly differ from the latter in building covered nests, which are often exceedingly elaborate, retort-shaped affairs, or massed into compound structures containing "from twenty to more than three hundred separate habitations, which have no communication with one another beyond being under the same roof," as in the case of the Social Weaver Bird. The collective nest is added to each year, "until either the tree in which it is built gives way, or its branches can afford room for no more material; fresh nests are then built in neighboring trees by the younger birds, about twenty pairs joining together to work at each." Besides the Weaver Birds, many other South African birds either build covered nests or occupy holes in trees or rocks, yet very few of the species breeding in covered nests or in holes lay white eggs. In fact, some of the Weaver Birds, as the species of the large genus *Hyphantornis*, are remarkable for the variability of color of even eggs of the same pair of birds. In the Masked Weaver Bird (*H. velatus*) "they are of some shade of white, cream colour, pink, green, or blue; often unspotted, but more frequently marked, more or less thickly, with small spots and dots of various shades of red and brown; less often they are blotched and clouded heavily with large masses of the same colours." The nest is retort-shaped, but is without a neck.

Dr. Stark's 'Birds of South Africa' is a well arranged 'manual,' giving the characters of all the higher groups, with keys to the genera and species, full references to the literature, very full descriptions of the species, including variations of plumage with sex and age, the geographical range, and short life histories. The cuts, drawn especially for the work by Mr. H. Grönvold, mainly illustrate structural features, the head, or head, wing and foot, being usually figured for each genus; and several of the remarkable nests of Weaver Birds and Sunbirds are also illustrated. The book is beautifully printed, on heavy paper, and is in every way as attractive as the text is satisfactory and authoritative. — J. A. A.

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NOTES AND NEWS.

GEORGE B. SENNETT, an Active Member of the American Ornithologists' Union, died at his home in Youngstown, Ohio, March 18, 1900, at the age of 59 years. Mr. Sennett was born in Sinclairville, N. Y., July 28, 1840, and for many years had been a prominent manufacturer of oil-well machinery and engines, with his place of business formerly at Meadville, Pa., and later at Youngstown, Ohio. Although an active business man, he was, nevertheless, an enthusiastic ornithologist, and for a number of years was able to devote considerable periods to field work and more or less time to original research in systematic ornithology. His special field of investigation was the Lower Rio Grande region of Texas, and his collection of Texas birds and birds' nests and eggs was the most extensive and most carefully selected and prepared ever brought together. His collection also includes many birds from northeastern Mexico, and a fair representation of the birds of North America at large. For many years this collection has been at the American Museum of Natural History in New York, where it has been of great service to the Museum, and has always been accessible to ornithologists desiring to make use of it.

His ornithological writings relate mainly to the birds of Texas, beginning with his 'Notes on the Ornithology of the Lower Rio Grande of Texas,' published in 1878, and his 'Further Notes on the Ornithology of the Lower Rio Grande of Texas,' published in 1879. In 1887 and during several following years his contributions to ornithological literature were frequent and important, his work being marked by keen insight, care and thoroughness. Later he became more deeply engrossed in business, but lost none of his interest in birds, and looked eagerly forward to an early retirement, when he would be free to devote his time to ornithological pursuits, including the completion of a long-projected illustrated work on the birds of Texas, on the preparation of which he had already spent much time and money. He was actively interested in the protection of birds, and for several years was chairman of the A. O. U. Bird Protection Committee. From 1887 to 1889 he was President of the Linnæan Society of New York, to whose interests he was ever heartily devoted. He was genial, generous, kind-hearted and conscientious, and will be greatly missed by those who had the pleasure of his acquaintance.

In accordance with a standing order of the Union respecting deceased Active Members (see Auk, XII, p. 199), a special memorial of his life and work will be presented at the next meeting of the American Ornithologists' Union and published later in 'The Auk.'

WILLIAM EDWIN BROOKS, a Corresponding Member of the American Ornithologists' Union, died at his residence, Mount Forest, Ontario, on January 18, 1899, at the age of 70 years. He was the son of W. A. Brooks, of Newcastle-on-Tyne, England, and was born in 1829. His father was chief engineer on the Tyne docks and harbor works, where for several years young Brooks was employed as his father's assistant. In 1856 he went to India as a civil engineer on the East India Railway, and was one of the original constructors of that line. In 1881 he came to Canada, and settled at Milton, Ontario, but later moved to Chilliwack, British Columbia, returning again to Ontario in 1891, and resided during his later years at Mount Forest.

His ornithological work related almost entirely to India birds; he was an active co-worker with Mr. Allan Hume, and from 1873 to 1880 published many papers on India birds in 'Stray Feathers,' in the 'Journal' of the Asiatic Society of Bengal, and in 'The Ibis.' He gave particular attention to the smaller Warblers, and was a special authority on the genus *Phylloscopus*, of which he discovered several new species. One of his latest contributions to 'The Ibis' related to this group. He also devoted considerable attention to the Raptores, closely studying the change of plumage in the smaller Eagles, which he kept alive for this purpose. His large collection of Indian birds is now in the British Museum. He was elected a Corresponding Member of the A. O. U. in 1886, and became a member of the B. O. U. in 1892. His son, Allan Brooks, is a well-known Canadian ornithologist.

FRANCIS C. BROWNE, an Associate Member of the American Ornithologists' Union, and an occasional contributor to the 'Nuttall Bulletin,' 'The Auk,' and to 'Forest and Stream,' died at his home in Framingham, Mass., Jan. 9, 1900, aged 70.

In speaking of Mr. Browne we find little that he himself would think worth recording about his life; few of those things which deserve to be called events. He was a modest, shy, reserved man, who loved nature and the observation of nature, and shunned public notice as if it were infection. After his graduation at Harvard College (1851) he never attended the annual class meetings and, it is believed, never cared to revisit Cambridge. He never sought amusement outside of his own home, excepting only his annual visit to Clark's Island in Plymouth, for duck-shooting at the season of the autumnal migration. Although of most amiable and kindly temper and holding liberal views, he cared little for society or to make intimate acquaintance among his towns-people. He seldom went to Concord where he had passed his youth and was fitted for college, and where he had many attached friends and relatives. His chief delight and the occupation of his leisure hours was to arrange and catalogue his possessions in bird skins, shells and coins, upon which he spent a not inconsiderable amount of money, and to which he was constantly adding, by purchase or exchange, up to the last month of his life.

Mr. Browne was a born naturalist, and his mind was doubtless stimulated in his boyhood by the society of such men as Henry Thoreau, Channing, and Ralph Waldo Emerson (who married Mr. Browne's aunt), in Concord, and also by association with Dr. Charles T. Jackson, the discoverer of ether, who was his uncle.

While in college, he was soon made a member of the Harvard Natural History Society, and its Curator of Ornithology, and quickly became distinguished among his fellows by his work in arranging the cabinets of specimens and by his literary communications at the meetings of the society. He became, moreover, at about this time a frequent visitor at the rooms of the Boston Natural History Society, then in Mason St., Boston. To their collection he made some valuable gifts of birds shot by himself. He was also a frequent attendant at the meetings of this society, of which Dr. C. T. Jackson was President. Here he came to know such men as Agassiz, Jeffries Wyman, Gould, Storer, Bryant, Cabot, and others, and saw many of the distinguished naturalists of the time. Mr. Browne was also an early member of the Nuttall Ornithological Club of Cambridge, and of the American Ornithologists' Union.

In 1850 (his junior year), his health compelled him to give up study for a time and he went to Labrador, where he collected many birds among others a fine 'Labrador' or 'Black' Gyrfalcon, which he presented to the Boston Natural History Society. This bird, little known at that time, was the first of the species to be placed in the society's collection. It was largely through the influence of Mr. Browne that the first specimen known to have been certainly taken in Massachusetts of the Glossy Ibis was given to this society in 1850. His neat article on this subject, published in 'The Auk' for April, 1887, p. 97, tells the whole story. Mr. Browne had in his collection a unique specimen, a little Black Rail, so far as known the first of that species taken in New England, and still rarely found there. It was picked up dead on Clark's Island, Plymouth Harbor.

In the early spring of 1851, Mr. B. went to Florida where he joined Prof. Agassiz's party at Key West. He camped in the Everglades and upon the Miami River, and secured many, at that time, rare and valuable specimens.

Mr. Browne was, in his college days, an enthusiastic sportsman, and loved a dog and a gun and a solitary tramp in the woods above everything; and this love continued to the end of his life. With the instinct of a true sportsman and naturalist he recognized and drew to him all those who shared his tastes. So scrupulously did he avoid observation that few but the true ornithologist and mammalogist, or the expert in conchology, were aware of his knowledge in these departments, and they knew him chiefly by correspondence.

Throughout his college life he kept a diary which is especially rich in recounting his experiences as a hunter and collector. He gives a detailed

account of his trips to Labrador and Florida, and this journal has to-day for those who knew him and remember his old associates, a peculiar charm. Soon after he came to Framingham his journal ceases.

It was intended that he should study some profession, but his eyesight failing he was compelled to give up books and was advised to take a farm, and so began life in Framingham in 1853, and remained there until his death. In his domestic relations he seems to have been most fortunate and happy. He was a devoted son, and when married found his chief delight in the attractions of a pleasant, retired home among meadows, ponds, and woods. He married early a charming woman who appreciated his character and made his house attractive.

We know that when Mr. Browne was about ten or twelve years of age he was at Brook Farm under the tutelage of A. Bronson Alcott and living in his family. This early training and his attachment to Henry Thoreau may have had much to do with determining his tastes and the bent of his mind. His character was marked by a modest self-appreciation, a dislike of all show or pretence, a love of honest simplicity in living and thinking, and of all that is true and pure. He was always humble, charitable to the views of those who differed from him, apt to question the value of his own observations, seldom referring to his contributions to science. Simple and refined, he was always a gentleman and a scholar without pretending to the rôle of either. He had no coarse streaks about him; he had a discriminating taste in literature and loved music. We are indebted to him for many contributions to our knowledge of bird-life (migrations, habits, etc.), things which only patient, loving attention and study could enable any one observer to discover. He took pride in keeping abreast of modern ideas upon ornithology and nomenclature, and was a diligent reader of 'The Auk' and other journals of his favorite science.

Mrs. Browne outlived her husband but a few days leaving one child, a daughter. —Z. B. Adams.

John A. Dakin, an Associate Member of the American Ornithologists' Union, died, after an illness of six days, at his home in Syracuse, N. Y., Feb. 21, 1900, at the age of 48 years. Mr. Dakin was born at Hillsdale, Columbia County, N. Y., in 1852, but when a small boy moved to Tully, N. Y., with his parents, where he received his first education in one of the district schools. He early manifested his love for birds, and later acquired a thorough knowledge of the birds of Onondaga County. In 1882 he went to Florida and hunted through the Everglades and along the Oklawaha River, collecting specimens and studying the birds of that region. He also gave much attention to the heronries, which were then innumerable on the brushy islands and shores of White Lake. After remaining in Florida four years he returned North, and fixed his home in Syracuse. In 1893 he took up the study of Lepidoptera, which he

pursued with equal enthusiasm with that of birds, and when he died had one of the largest collections of North American Lepidoptera in this section. He was a charter member and founder of the Onondaga Academy of Sciences, and contributed to it many valuable papers on the birds and insects of Onondaga County. He was a great advocate of bird protection, and read many papers on this subject before schools and other societies. He was gifted with a graceful pen, and his simplicity of style made his writings peculiarly attractive. He possessed a singularly attractive personality, which endeared him to all; and his honesty, modesty, and lofty principles won for him universal esteem. — A. W. PERIOR.

FOSTER H. BRACKETT, an Associate Member of the American Ornithologists' Union, died at his home in Dorchester, Mass., January 5, 1900, aged, 37 years. He was born in Fall River, Mass., but his parents removed to Roxbury, Mass., when he was a year old, where he received his education in the public schools and at a business college in Boston. When twenty years of age he entered the banking house of Blake Brothers & Co., Boston, with whom he remained till his death. Mr. Brackett was especially interested in the study of birds, to which all his leisure time was devoted, and had just acquired great familiarity with the birds of New England, of which he had made a considerable collection. His ornithological publications consisted of a few notes contributed from time to time to 'The Auk.' His many amiable traits of character had won for him a wide circle of friends. A widow, a son and two daughters survive him.

ON JANUARY 4, 1900, the Delaware Valley Ornithological Club celebrated the tenth anniversary of its organization. The meeting was held at the Academy of Natural Sciences of Philadelphia, the addresses being by Mr. Witmer Stone 'On the History of the Club,' and by Mr. Wm. L. Baily on 'Ornithological Photography.' Starting with a membership of seven in 1890, with the idea of making combined observations on bird migration in the Delaware Valley, the Club has grown to a membership of 88. Besides the establishment of regular bimonthly meetings, the organization has issued several publications, notably the 'Birds of Eastern Pennsylvania and New Jersey,' and has presented the Philadelphia Academy with an excellent local collection of birds and nests. It is now established on a firm basis, and it is to be hoped it will continue to increase the general interest in ornithology in Philadelphia and its vicinity, which it has been instrumental in arousing. Among the papers read during the year were the following: 'Probable Breeding of the Prothonotary Warbler in Delaware,' by W. Gordon Smith; 'The Heath Hen in Martha's Vineyard,' by H. L. Coggins; 'Glimpses of Bird Life in Mexico,' by S. N. Rhoads; 'Life and Habits of the Clapper Rail,' by I.

N. De Haven; 'Spring Flight of Shore Birds at Holly Beach, N. J.,' by W. L. Baily; 'History of the Little Black Hawk in Florida,' by C. J. Pennock. The officers for the ensuing year are: President, Charles J. Rhoads; Vice-President, Chas. J. Pennock; Secretary, Henry W. Fowler; Treasurer, Wm. L. Baily.

At a recent meeting of the State Horticultural Society of Illinois, the following resolution was unanimously adopted:

"*Whereas*, Great progress has been made in the last few years in our knowledge of the economic relations of the birds, and it is now known that the birds have a direct and important influence on horticulture; and that their presence in our orchards and fruit gardens is essential to the preservation of the crops from insects; therefore be it

"*Resolved*, That a better knowledge of the birds, of their effects on horticulture, their habits, the conditions governing their actions, methods of encouraging their presence and of protecting the fruits while ripening from their attacks ought to be spread among the people of our State; that this Society, therefore, urges the consideration of this question on our branch societies, our Farmers Institutes, and all kindred institutions; and we further desire that the study of the birds should be more extensively introduced into our schools and a knowledge of their habits and their value spread among our young people, by all practicable means, and thereby assist in the enforcement of the already efficient laws now in existence."

During the past three months some important results in bird protection have been accomplished by members of the Union working in conjunction with the Protection Committee. Early in March a notice appeared in a Philadelphia paper giving details of a contract between certain parties in Delaware and a commission house in New York, by which the former were to procure and ship to the latter 20,000 bird skins for millinery purposes. The Chairman, Mr. Stone, in company with Mr. Poole, President of the Delaware Game Protective Association, visited Governor Tunnell of Delaware, and found him to be enthusiastic on the subject of bird protection. He proposed to have the Secretary of State issue a warning about shooting insectivorous birds. As the Pennsylvania Railroad system controls all the railroads in Delaware, a letter was written to the President, Mr. A. J. Cassatt, calling his attention to the contract and also to the Delaware statute regarding common carriers transporting birds out of the State. A reply was received in due course of mail saying: "The attention of this Company's agents in Delaware has been called to the law to which you refer and they have been cautioned to conform strictly thereto." Mr. J. B. Thayer, Jr., General Freight Agent, issued order 'G. F. A. No. 221½' as a large poster "to be posted in two public and conspicuous places in each Freight Station: Law Prohibiting the Killing or Destruction of Birds in the State of Delaware." Then follows the full text of the law, followed by the order: "Agents

are instructed that this law must be strictly observed, and they must, therefore, decline to receive any such birds for transportation." Mr. Thayer also wrote: "We have requested the Adams Express Company to issue a similar notice to express agents, to cover service by express."

This agitation has aroused the whole State, and farmers are posting their land. The public press gave valuable aid, and it is probable that every person in Delaware now knows the reasons for bird protection. It is hoped that another Audubon Society may result.

The Union has always found the U. S. Lighthouse Board very heartily in sympathy with the work of bird protection, and it has lately issued the following order to the district officers of all the lighthouse districts on the Atlantic, Gulf, Northern Lake, and Pacific coasts: "The Board requests you to issue a circular letter to all light stations in your district cautioning light keepers against the violation of the game laws of the States in which they may be stationed, and to inculcate in them a spirit of protection, not only of the game birds, but of song birds, and of all bird life."

Our member, Mr. Abbott H. Thayer, recognizing the frightful destruction of the Gulls and Terns that has been going on for a few years past, and the immediate necessity for special protection for the small remainder, made an appeal to the public through a selected list of newspapers, for funds to be used in hiring wardens to protect the birds while nesting. Already quite a large number of subscriptions have been received by the Treasurer, aggregating $600. Active efforts are being made to locate breeding colonies of seabirds along our Atlantic seaboard, and as fast as any are found, to obtain the services of a trustworthy and fearless warden to protect them during the breeding season. All the Massachusetts colonies of Terns are being cared for as usual this year by their devoted guardian, our fellow member Mr. Geo. H. Mackay. The Tern colony that was driven from Great Gull Island, N. Y., when it was occupied by the General Government as a site for a fortification, has gone to Gardiners Island, N. Y., where they are afforded absolute protection by the owner, Mr. John Lyon Gardiner, and Mr. F. Aug. Schermerhorn, who has the shooting rights on the island. Both of these gentlemen are ardent and enthusiastic bird protectors.

Arrangements have already been made to protect the Terns breeding in southern New Jersey, and the U. S. Lighthouse Board has issued special orders to the light keeper at the Great Duck Island Light Station, Maine, to prevent the destruction of the colony of Herring Gulls that live on that lighthouse reservation. Plume hunters and milliners' agents, having nearly exterminated the sea birds on the southern and middle Atlantic coast, have attacked our northern seaboard. Maine ornithologists complain that commercial houses in New York and Boston send agents along the Maine coast offering to purchase all the seabirds that can be killed. In one case a dealer furnished guns and ammunition to the Quoddy Indians to help on the dreadful work. In

this connection the Protection Committee consider it the urgent duty of every member of the American Ornithologists' Union, to write at once to his representative in Congress requesting him to help the passage of House Bill No. 6634, introduced by the Hon. Mr. Lacey of Iowa, which is to enlarge the powers of the Department of Agriculture, to prohibit the interstate transportation of game killed in violation of local laws, and for other purposes. It provides "that it shall be unlawful for any person or persons to deliver to any common carrier, or for any common carrier to transport from one State or Territory to another State or Territory .... the dead bodies or *parts thereof* of any wild animals or birds, where such animals or birds have been killed in violation of the laws of the State or Territory in which the same were killed." If this bill becomes a law it will do much to stop the traffic in bird skins for commercial purposes; and it will then be necessary to have uniform bird laws in all the States and Territories. The Protection Committee therefore request that members of the Union in the several States take up the matter of local bird laws and consult with the Committee preparatory to a concerted movement in the fall and winter of 1900–01.

The New York Audubon Society introduced a bill in the Legislature in January, through Assemblyman Hallock, amending sections 33 and 39, Chapter 20 of the laws of 1900, 'Certain Wild Birds Protected,' by adding the words: "No part of the plumage, skin or body of any bird protected by this section shall be sold or had in possession for sale." There is every prospect that this amendment will become a law.

Commission houses in New York City, in their endeavor to obtain bird skins for millinery purposes, send out many circulars offering varying scales of prices for bird skins. Recently a postal card was sent by one of these firms to postmasters along the Gulf coast soliciting Gulls, Terns, Grebes, Barn Owls, etc. Our member, Dr. T. S. Palmer of Washington, brought this matter to the attention of the Hon. Jas. Wilson, Secretary of Agriculture, who at once sent a very urgent letter to Hon. Chas. Emory Smith, Postmaster General, calling his attention to this direct violation of the law. His response was quick and direct:

"Caution to Postmasters — Protest against collection of plumed birds through Postmasters.

"Post Office Department, Washington, D. C., Feb. 2, 1900.

"The attention of postmasters is called to a letter received from the Secretary of Agriculture, which is printed herewith.

"Postmasters are expressly enjoined against being parties to any transaction that violates State law.

CH. EMORY SMITH,
Postmaster-General."

The recent activity of dealers in bird skins for millinery purpose has thus happily done much to arouse public sentiment in behalf of the birds, and has led to renewed and successful action against their nefarious business. — WILLIAM DUTCHER.